

***Environmental Assessment***  
***Wing Infrastructure Development Outlook***  
***(WINDO) Implementation Plan (FY 04-06)***  
***Volume 2***

***Beale Air Force Base, California***

***August 2005***

Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE <b>AUG 2005</b>		2. REPORT TYPE		3. DATES COVERED <b>00-00-2005 to 00-00-2005</b>	
4. TITLE AND SUBTITLE <b>Environmental Assessment Wing Infrastructure Development Outlook (WINDO) Implementation Plan (FY 04-06) Volume 2 Beale Air Force Base, California</b>				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) <b>engineering-environmental Management, Inc. ( e2M),9563 Kingston Ct,Englewood,CO,80112</b>				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT <b>Approved for public release; distribution unlimited</b>					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT <b>Same as Report (SAR)</b>	18. NUMBER OF PAGES <b>218</b>	19a. NAME OF RESPONSIBLE PERSON
a. REPORT <b>unclassified</b>	b. ABSTRACT <b>unclassified</b>	c. THIS PAGE <b>unclassified</b>			



**FINDING OF NO SIGNIFICANT IMPACT (FONSI)  
AND  
FINDING OF NO PRACTICABLE ALTERNATIVE (FONPA)**

---

**1.0 NAME OF THE PROPOSED ACTION**

Wing Infrastructure Development Outlook (WINDO) Implementation Plan (FY 04–06) at Beale Air Force Base (AFB), California: Volume 2.

**2.0 DESCRIPTION OF PROPOSED ACTION AND NO ACTION ALTERNATIVES**

**Proposed Action.** The Proposed Action consists of 12 projects. These 12 projects (construction, demolition, and restoration) are listed below. No changes in personnel requirements or aircraft operations would occur.

- **Construct Heritage Park.** Enhance the sense of community, mission, and history for Beale AFB personnel and visitors.
- **Install Global Hawk Launch and Recovery Element (LRE) Cables.** Support Global Hawk mission requirements.
- **Upgrade JP-8 Hydrant Pit and Lids.** Upgrade existing hydrants that do not meet American Petroleum Institute standards, and improve worker safety and working conditions.
- **Vernal Pool Restoration Phase 2.** Mitigate for past threatened and endangered species habitat impacts as well as restore areas to be used toward future mitigation requirements.
- **Construct Visitor Center Main Gate.** Improve AT/FP for the base, streamline driver and security pass processing, and improve safety conditions for visitors to the base.
- **Pollution Prevention (P2) Rock Crusher.** Clean up and recycle concrete and asphalt piles and foundations, comply with Public Resources Code 40191, and correct a notice of violation from the Yuba County Environmental Health Department.
- **Construct Flightline Centralized Parking South Access Road.** Increase AT/FP in the vicinity of the flightline, and improve and control vehicular traffic in the vicinity of flightline infrastructure and facilities.
- **Construct Gas Service Station, Auto Hobby Shop, and Car Wash.** Provide a second service station on the base, and provide personnel on the base with a controlled area to service their own vehicles.
- **Erosion Control at Upper Blackwelder Lake.** Repair extensive erosion and downstream sedimentation at the western end of Upper Blackwelder Lake, and remove all concrete debris that has been placed into the two southwestern drainages to stop this erosion from advancing.
- **Erosion Control at Miller Lake.** Repair extensive erosion and downstream sedimentation at Miller Lake Dam, improve the integrity of the dam, and repair unsafe conditions.
- **Erosion Control at Lower Blackwelder Dam.** Repair extensive erosion and downstream sedimentation at Lower Blackwelder Lake Dam, improve the integrity of the dam, and repair unsafe conditions.
- **Repair Force Protection at Recce Point Club.** Comply with AT/FP standards that require parking to be sufficient distance from all critical facilities and infrastructure.

**No Action Alternative.** Under the No Action Alternative, Beale AFB would continue to use its facilities and infrastructure in its current condition and configuration. This alternative would not address the mission, security, and safety requirements of the ACC and Beale AFB, or meet the standards specified in Unified Facilities Criteria 4-010-01.

### **3.0 SUMMARY OF ENVIRONMENTAL EFFECTS**

**Biological Resources.** Approximately 0.80 (direct 0.21 and indirect 0.59) acres of potential branchiopod habitat would be impacted by the Proposed Action. To minimize or compensate for potential impacts associated with the Proposed Action, approximately 1.59 acres of suitable branchiopod habitat would be preserved and 0.21 acres of suitable branchiopod habitat would be restored. A Biological Opinion was approved by the U.S. Fish and Wildlife Service (USFWS) for the Proposed Action on 24 June 2005.

The P2 Rock Crusher and Vernal Pool Restoration Phase 2 projects would result in beneficial effects on threatened and endangered species habitat because there would be a net increase of vernal pools on Beale AFB. Habitat creation and restoration activities under these projects would not contribute to adverse cumulative effects on special status species or their sensitive habitats because no permanent loss of these habitats would occur.

**Water Resources.** Other than as stated in biological resources above, there would be no significant impact on surface waters or groundwater as a result of implementation of the Proposed Action. The effects from minor increases in storm water runoff could lead to erosion, transfer of pollutants, or flooding; however, these effects would not be substantial.

The Proposed Action involves construction activities within the 100-year floodplain on Beale AFB. The U.S. Air Force (USAF) has prepared a FONPA demonstrating there are no practicable alternatives to the Proposed Action that would result in fewer impacts on the floodplain. Most of the construction activities occur in areas that are already disturbed. During construction, impacts would be kept as minimal as possible by using best available control measures. In addition, the Proposed Action would be designed to allow adequate storm water drainage and free flow of water during rain events. Therefore, the Proposed Action would not have an adverse impact on the 100-year floodplain on Beale AFB.

The Proposed Action would directly impact 13.69 acres of jurisdictional waters of the U.S. Section 401 and 404 permit applications were approved by the U.S. Army Corps of Engineers, Sacramento District and the California Regional Water Quality Control Board, Central Valley Region for the Install Global Hawk LRE Cables and Erosion Control at Upper Blackwelder Lake projects in July 2005. The base will submit Section 401 and 404 permit applications for Construct Heritage Park, Vernal Pool Restoration Phase 2, Construct Visitor Center Main Gate, Erosion Control at Miller Lake, and Erosion Control at Lower Blackwelder Lake projects once project designs are complete. Approval of these Section 401 and 404 permit applications would be obtained prior to commencement of construction activities.

**Geological Resources.** There would be no significant impacts on geological resources as a result of implementation of the Proposed Action. The effects on soil erosion and sedimentation from construction activities are considered minor because erosion and sediment controls would be in place during construction to reduce and control siltation or erosion impacts to areas outside of the construction site.

**Cultural Resources.** There is a potential for impacts on one archaeological site within the Area of Potential Effect (APE) of Vernal Pool Restoration Phase 2 resulting from subsurface excavation, grading, operation, or maintenance associated with construction of the proposed projects. Consultation with the State Historic Preservation Officer (SHPO) would be undertaken during the Vernal Pool Restoration

Phase 2 project design process. Completion of Section 106 consultation with SHPO is required prior to commencement of construction activities.

**Air Quality.** There would be no significant impacts on regional or local air quality from the Proposed Action. The effects on air quality would be a temporary increase in construction-related emissions during project construction. The Proposed Action would generate emissions well below conformity *de minimis* limits as specified in 40 Code of Federal Regulations Part (CFR) 93.153. Because the emissions generated would be below *de minimis* levels, it is reasonable to assume that the temporary construction emissions caused by the Proposed Action would not cause a violation of the National Ambient Air Quality Standards, and a full Conformity Determination would not be required.

**Hazardous Materials and Waste Management.** There would be no significant impacts on hazardous materials and wastes management due to implementation of the Proposed Action. Minor hazardous materials and wastes would be generated during project construction. In addition, the Proposed Action is within or in close proximity to four open Environmental Restoration Program (ERP) sites: SD-01, West Side Drainage Ditch; WP-16, Explosive Ordnance Disposal Area; ST-22, Basewide Underground Storage Tanks; and SD-32, Building 1086. The ERP Program Manager would consult with the HQ Restoration Program Manager and arrange for a waiver to the restrictions on disturbing an ERP site prior to the proposed projects commencing construction activities. Because of the potential threat of contamination from ERP sites during construction, it is recommended that a health and safety plan be prepared in accordance with Occupational Safety and Health Administration (OSHA) requirements prior to commencement of construction activities. In addition, should contamination be encountered, handling, storage, transportation, and disposal activities would be conducted in accordance with applicable Federal, state, and local regulations, Air Force Instructions, and Beale AFB programs and procedures. While working within ERP Site SD-01, workers would either be 40-hour Hazardous Waste Operations and Emergency Response trained, or would be overseen by a supervisor with OSHA Site Supervisor certification.

**Transportation.** There would be no significant impacts on transportation due to implementation of the Proposed Action.

**Safety and Military Munitions Response Program (MMRP).** There would be no significant impacts on structure or personnel safety due to implementation of the Proposed Action. Implementation of the Proposed Action would slightly increase the short-term risk associated with construction contractors performing work at Beale AFB during the normal workday because the level of such activity would increase.

The 12 proposed project sites are located within ranges sites. These range sites contain various munitions, unexploded ordnance (UXO), and Chemical Agent Identification Sets (CAIS). Most of the munitions, UXO, and CAIS on the surface have been removed. However, munitions, UXO, and CAIS still can be found below the ground surface. The need for munitions, UXO, and CAIS screening at potential UXO sites would be determined on a case by case basis. Any projects located within potential UXO sites would obtain an environmental restoration waiver from HQ ACC/CEVR prior to commencement of construction activities. The ERP Program Manager would consult with the HQ Restoration Program Manager and arrange for a waiver to the restrictions on disturbing areas with potential munitions, UXO, and CAIS prior to commencement of construction activities.

#### 4.0 CONCLUSION

Based on the provisions set forth in the Proposed Action, all activities were found to comply with the criteria or standards of environmental quality and coordinated with the appropriate Federal, state, and

local agencies. The attached EA and a draft of this FONSI/FONPA were made available to the public on 16 August 2005 for a 30-day review period. Agencies were coordinated with throughout the EA process and their comments were incorporated into the analysis of potential environmental impacts performed as part of this EA. No public comments were received during this review period.

## 5.0 FINDINGS

***Finding of No Practicable Alternative.*** Reasonable alternatives were considered, but no other alternative to the Proposed Action meets the safety or operational requirements of the 9th Reconnaissance Wing (9 RW). Pursuant to Executive Orders 11988 and 11990 and the authority delegated by Secretary of the Air Force Order 791.1, and taking the above information into account, I find that there is no practicable alternative to this action and that the Proposed Action includes all practicable measures to minimize harm to the environment. This decision has been made after taking into account all submitted information, and considering a full range of practical alternatives that would meet project requirements and are within the legal authority of the USAF.

***Finding of No Significant Impact.*** After review of the EA prepared in accordance with the requirements of the National Environmental Policy Act, the Council on Environmental Quality regulations, and *Environmental Impact Analysis Process*, 32 CFR Part 989, as amended, I have determined that the Proposed Action would not have a significant impact on the quality of the human or natural environment. An Environmental Impact Statement will not be prepared. This decision has been made after taking into account all submitted information, and considering a full range of practical alternatives that would meet project requirements and are within the legal authority of the USAF.

  
TIMOTHY A. BYERS

Colonel, USAF

Director of Installations and Mission Support (A7)

20 OCT 05

Date

## **ABBREVIATIONS AND ACRONYMS**

9 CES/CEV	9th Civil Engineering Squadron/Environmental Flight
9 RW	9th Reconnaissance Wing
AAFES	Army & Air Force Exchange Service
ACC	Air Combat Command
ACM	asbestos-containing material
AFB	Air Force Base
AFI	Air Force Instruction
AOC	Area of Concern
APE	Area of Potential Effect
API	American Petroleum Institute
AQCR	Air Quality Control Region
ARPA	Archaeological Resources Protection Act
AT/FP	Anti-Terrorism/Force Protection
CA	California
CAA	Clean Air Act
CAIS	Chemical Agent Identification Sets
Cal-EPA	California Environmental Protection Agency
CARB	California Air Resources Board
CATEX	Categorical Exclusion
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CNDDB	California National Diversity Database
CO	carbon monoxide
CRMP	Cultural Resources Management Plan
CRWQCB	California Regional Water Quality Control Board
DERP	Defense Environmental Restoration Program
DESC	Defense Energy Systems Command
DGPS	Differential Global Positioning System
DMM	Discarded Military Munitions
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EO	Executive Order
EQD	Explosive Quantity Distance
ERA	Environmental Restoration Account
ERP	Environmental Restoration Program
ft <sup>2</sup>	square feet
FIP	Federal Implementation Plan
FONPA	Finding of No Practicable Alternative
FONSI	Finding of No Significant Impact
FRAQMD	Feather River Air Quality Management District
FY	Fiscal Year
HQ	Headquarters
HQ ACC/CEVC	Headquarters Air Combat Command/Environmental Flight
HPTP	Historic Properties Treatment Plan
INRMP	Integrated Natural Resources Management Plan
LBP	lead-based paint



LRE	Launch and Recovery Element
mg/m <sup>3</sup>	milligrams per cubic meter
MC	Munitions Constituents
MILCON	Military Construction
MMRP	Military Munitions Response Program
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO <sub>2</sub>	nitrogen dioxide
NO <sub>x</sub>	nitrogen oxide(s)
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSVAB	Northern Sacramento Valley Air Basin
O <sub>3</sub>	ozone
O&M	Operations and Maintenance
OSHA	Occupational Safety and Health Administration
P2	Pollution Prevention
P.L.	Public Law
Pb	lead
PM <sub>10</sub>	particulate matter less than or equal to 10 microns in diameter
PM <sub>2.5</sub>	particulate matter less than or equal to 2.5 microns in diameter
POV	privately owned vehicle
ppm	parts per million
QOL	Quality of Life
RCRA	Resource Conservation and Recovery Act
SAAQS	State Ambient Air Quality Standards
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SO <sub>2</sub>	sulfur dioxide
SOP	Standard Operating Procedure
SR	State Route
SRMC	Sustainment, Restoration, and Modernization for Contract
TCE	trichloroethylene
TCP	Traditional Cultural Properties
tpy	tons per year
U.S.C.	United States Code
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
UST	underground storage tank
UXO	unexploded ordnance
VELB	valley elderberry longhorn beetle
VOC	volatile organic compound
WAC	Women's Army Corps
WINDO	Wing Infrastructure Development Outlook
yd <sup>3</sup>	cubic yards
µg/m <sup>3</sup>	micrograms per cubic meter



**ENVIRONMENTAL ASSESSMENT  
WING INFRASTRUCTURE DEVELOPMENT OUTLOOK  
(WINDO) IMPLEMENTATION PLAN (FY 04–06)  
VOLUME 2  
BEALE AIR FORCE BASE, CALIFORNIA**

---

**Beale Air Force Base  
Environmental Flight  
6601 B Street  
Beale Air Force Base, CA 95903-1712**

**AUGUST 2005**



**ENVIRONMENTAL ASSESSMENT OF  
WING INFRASTRUCTURE DEVELOPMENT OUTLOOK (WINDO)  
IMPLEMENTATION PLAN (FY 04–06)  
AT BEALE AIR FORCE BASE, CALIFORNIA  
VOLUME 2**

**TABLE OF CONTENTS**

<b>1.0 INTRODUCTION.....</b>	<b>1-1</b>
1.1 Background.....	1-1
1.2 Purpose of and Need for the Proposed Action.....	1-1
1.3 Assessment Approach.....	1-4
1.4 Introduction to the Organization of this Document.....	1-5
<b>2.0 PROPOSED ACTION AND ALTERNATIVES .....</b>	<b>2-1</b>
2.1 Proposed Action .....	2-1
2.2 No Action Alternative .....	2-27
2.3 Other Alternatives Considered But Eliminated From Further Review.....	2-30
<b>3.0 AFFECTED ENVIRONMENT .....</b>	<b>3-1</b>
3.1 Air Quality.....	3-2
3.2 Biological Resources .....	3-4
3.2.1 Annual Grasslands.....	3-7
3.2.2 Wetland Resources .....	3-8
3.2.3 Special-Status Species .....	3-9
3.3 Water Resources .....	3-10
3.4 Cultural Resources.....	3-13
3.5 Geological Resources .....	3-16
3.6 Hazardous Materials and Waste Management.....	3-17
3.7 Safety and Military Munitions Response Program (MMRP) .....	3-21
3.8 Transportation.....	3-23
<b>4.0 ENVIRONMENTAL CONSEQUENCES .....</b>	<b>4-1</b>
4.1 Air Quality .....	4-1
4.1.1 Proposed Action .....	4-3
4.1.2 No Action Alternative .....	4-4
4.2 Biological Resources .....	4-4
4.2.1 Proposed Action .....	4-4
4.2.2 No Action Alternative .....	4-14
4.3 Water Resources .....	4-14
4.3.1 Proposed Action .....	4-14
4.3.2 No Action Alternative .....	4-28
4.4 Cultural Resources.....	4-28
4.4.1 Proposed Action .....	4-29
4.4.2 No Action Alternative .....	4-32
4.5 Geological Resources .....	4-32
4.5.1 Proposed Action .....	4-32
4.5.2 No Action Alternative .....	4-32



4.6	Hazardous Materials and Waste Management.....	4-32
4.6.1	Proposed Action .....	4-33
4.6.2	No Action Alternative .....	4-34
4.7	Safety and MMRP .....	4-34
4.7.1	Proposed Action .....	4-35
4.7.2	No Action Alternative .....	4-35
4.8	Transportation.....	4-35
4.8.1	Proposed Action .....	4-36
4.8.2	No Action Alternative .....	4-36
<b>5.0</b>	<b>CUMULATIVE AND ADVERSE IMPACTS.....</b>	<b>5-1</b>
5.1	Unavoidable Adverse Impacts .....	5-1
5.2	Compatibility of the Proposed Action and Alternatives with the Objectives of Federal, Regional, State, and Local Land Use Plans, Policies, and Controls.....	5-3
5.3	Relationship Between Short-term Use and Long-term Productivity .....	5-4
5.4	Irreversible and Irretrievable Commitments of Resources .....	5-4
<b>6.0</b>	<b>LIST OF PREPARERS.....</b>	<b>6-1</b>
<b>7.0</b>	<b>REFERENCES .....</b>	<b>7-1</b>

#### **APPENDIX A – WINDO IMPLEMENTATION PLAN PROJECT LIST**

#### **APPENDIX B – CLEAN AIR ACT GENERAL CONFORMITY ANALYSIS EMISSIONS CALCULATIONS**

#### **APPENDIX C – BRANCHIOPOD HABITAT IN VICINITY OF PROPOSED ACTION**

#### **APPENDIX D – GLOBAL HAWK LRE CABLES SOIL REPORT**

#### **APPENDIX E – JURISDICTIONAL WATERS OF THE U.S. IMPACTED BY PROPOSED ACTION**

## LIST OF FIGURES

1-1	Beale AFB and Surrounding Area .....	1-2
2-1	WINDO Project Locations on Beale AFB .....	2-2
2-2	Construct Heritage Park .....	2-5
2-3	Install Global Hawk LRE Cables .....	2-7
2-4	Upgrade JP-8 Hydrant Pits and Lids .....	2-9
2-5	Vernal Pool Restoration Phase 2/Site 1 .....	2-10
2-6	Vernal Pool Restoration Phase 2/Site 2 .....	2-11
2-7	Vernal Pool Restoration Phase 2/Site 3 .....	2-12
2-8	Vernal Pool Restoration Phase 2/Inoculum Collection Near Main Gate .....	2-13
2-9	Construct Visitor Center Main Gate .....	2-15
2-10	P2 Rock Crusher .....	2-16
2-11	Construct Flightline Centralized Parking South Access Road .....	2-20
2-12	Construct Gas Service Station, Auto Hobby Shop, and Car Wash .....	2-21
2-13	Erosion Control at Upper Blackwelder Lake .....	2-22
2-14	Erosion Control at Miller Lake .....	2-25
2-15	Erosion Control at Lower Blackwelder Lake .....	2-26
2-16	Repair Force Protection at Recce Point Club .....	2-28
3-1	Habitat Types on Beale AFB .....	3-5
3-2	Major Surface Waters and 100-Year Floodplain on Beale AFB .....	3-11
3-3	Environmental Restoration Program Sites on Beale AFB .....	3-19
4-1	Branchiopod Habitat in Vicinity of Construct Heritage Park .....	4-7
4-2	Branchiopod Habitat in Vicinity of Construct Visitor Center Main Gate .....	4-9
4-3	Jurisdictional Waters of the U.S. Impacted by Construct Heritage Park .....	4-17
4-4	Jurisdictional Waters of the U.S. Impacted by Install Global Hawk LRE Cables .....	4-19
4-5	Jurisdictional Waters of the U.S. Impacted by Vernal Pool Restoration Phase 2/Site 1 .....	4-20
4-6	Jurisdictional Waters of the U.S. Impacted by Vernal Pool Restoration Phase 2/Inoculum Collection Near Main Gate .....	4-21
4-7	Jurisdictional Waters of the U.S. Impacted by Vernal Pool Restoration Phase 2/Site 2 .....	4-22
4-8	Jurisdictional Waters of the U.S. Impacted by Construct Visitor Center Main Gate .....	4-23
4-9	Jurisdictional Waters of the U.S. Impacted by Erosion Control at Upper Blackwelder Lake .....	4-24
4-10	Jurisdictional Waters of the U.S. Impacted by Erosion Control at Miller Lake .....	4-25
4-11	Jurisdictional Waters of the U.S. Impacted by Erosion Control at Lower Blackwelder Lake .....	4-27

## LIST OF TABLES

2-1	Projects Analyzed in this EA .....	2-1
3-1	National and California Ambient Air Quality Standards .....	3-3
3-2	Archaeological Sites Adjacent to the Proposed Action .....	3-15
3-3	Archaeological Sites Within the Boundary of the Proposed Action.....	3-16
3-4	Soil Series Associated with the Proposed Action .....	3-17
4-1	Conformity <i>de minimis</i> Emissions Thresholds .....	4-2
4-2	Annual Construction Emissions Estimates from the Proposed Action at Beale AFB, CA .....	4-3
4-3	Summary of Proposed Action Direct and Indirect Impacts on Branchiopod Habitat and Compensation Requirements .....	4-5
4-5	Project Area Affecting 100-Year Floodplain.....	4-26
4-7	Summary of Impacts on Cultural Resources Within the Boundary of the Proposed Action.....	4-29
5-1	Cumulative Effects on Resources .....	5-2

# 1.0 Introduction

---

## 1.1 Background

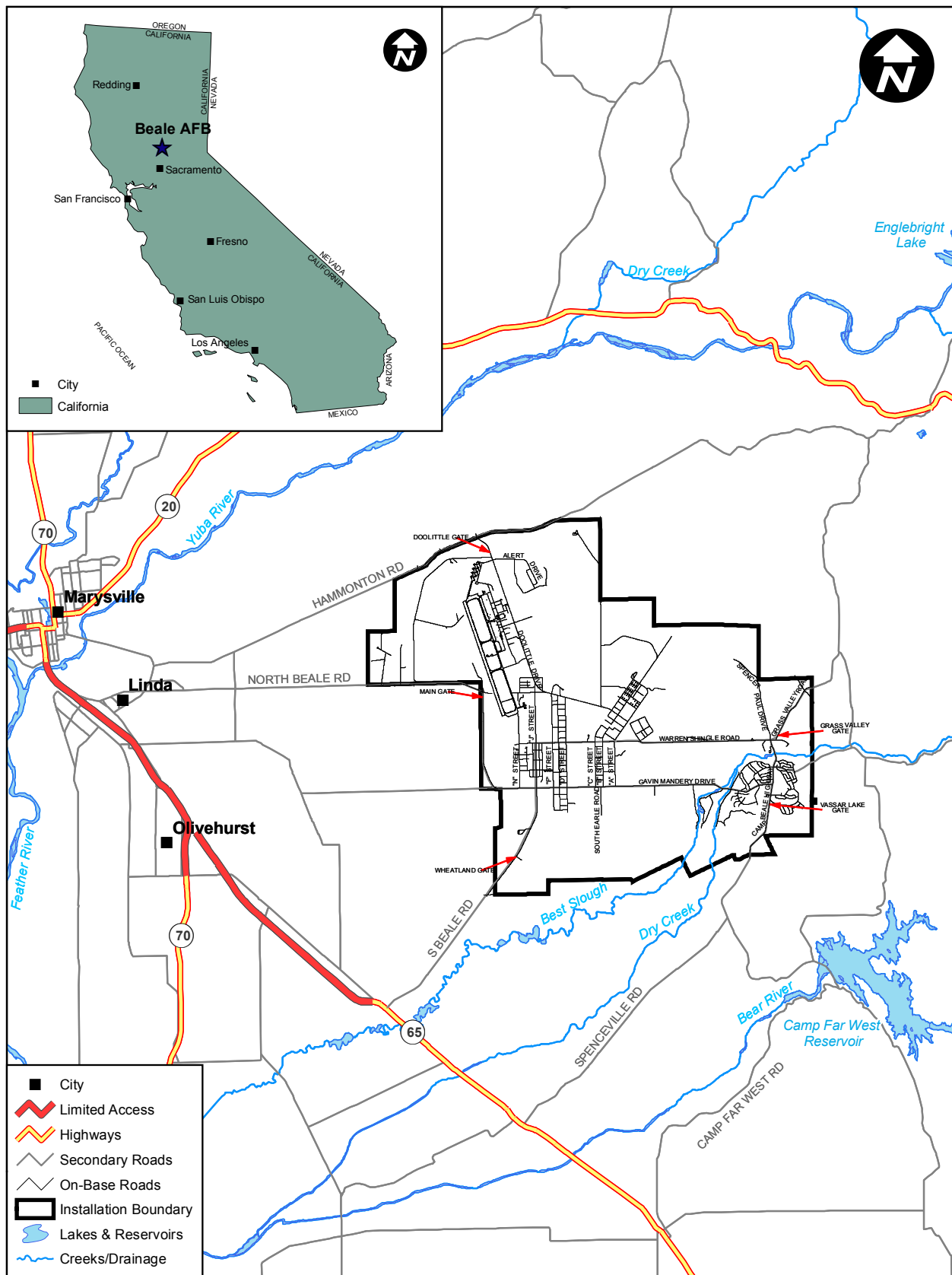
Beale Air Force Base (AFB) is a U.S. Air Force (USAF) base under the Air Combat Command (ACC). Beale AFB is headquarters to the 9th Reconnaissance Wing (9 RW). The 9 RW is responsible for providing national and theater command authorities with timely, reliable, high-quality, high-altitude reconnaissance products. To accomplish this mission, 9 RW is equipped with a fleet of U-2 and Global Hawk reconnaissance aircraft and associated support equipment. The Wing maintains a high state of readiness in its combat support and combat service support forces for potential deployment in response to theater contingencies. The 9 RW also provides support for Beale AFB, ranging from financial, personnel, housing, maintenance, legal, recreational, and medical needs to fire protection, chaplain services, and base security.

Beale AFB is a 22,944-acre military installation in Yuba County, California, approximately 40 miles north of Sacramento, 13 miles east of Marysville, and 25 miles west of Grass Valley (see Figure 1-1). The base is between the Yuba and Bear rivers in an area that characterizes the transition from the western Sacramento Valley east to the Sierra Nevada foothills.

## 1.2 Purpose of and Need for the Proposed Action

The purpose of the Wing Infrastructure Development Outlook (WINDO) Implementation Plan at Beale AFB is to improve the facility planning process, capture the Wing Commander's vision of what infrastructure improvements are necessary to support the base's ongoing mission, and link the Base General Plan to individual funding programs such as Military Construction (MILCON); Operations and Maintenance (O&M); Sustainment, Restoration, and Modernization for Contract (SRMC); Environmental Restoration Account (ERA); Defense Energy Systems Command (DESC); Anti-Terrorism/Force Protection (AT/FP); Quality of Life (QOL); and other programs to provide a solid plan that both the base and ACC agree upon and understand.

Headquarters (HQ) ACC identified the need to improve base planning and streamline National Environmental Policy Act (NEPA) compliance by preparing fewer, more comprehensive documents. Therefore, HQ ACC started an initiative called the WINDO Plan. The collective analysis of all appropriate WINDO projects in a single Environmental Assessment (EA) would reduce the overall analysis workload; streamline the NEPA review process; reduce project fractionation; coordinate land use



**Figure 1-1. Beale AFB and Surrounding Area**



planning; and provide cost savings through combining projects and maintaining a baseline for future analysis, tiering, and correct application of categorical exclusions (CATEXs).

The objective of this EA is to disclose and analyze potentially significant environmental impacts expected from implementation of Beale AFB's WINDO Implementation Plan and development projects and long-term mission-based actions which comprise the plan (the Proposed Action). A secondary objective of this EA is to determine the potential cumulative impacts from Beale AFB's mission basewide. This EA will discuss all WINDO projects that would directly, indirectly, or temporarily impact waters of the U.S. and threatened and endangered species habitat, or those that are adjacent to these areas.

The Proposed Action consists of 12 projects, described below.

- ***Construct Heritage Park.*** Enhance the sense of community, mission, and history for Beale AFB personnel and visitors.
- ***Install Global Hawk Launch and Recovery Element (LRE) Cables.*** Support Global Hawk mission requirements.
- ***Upgrade JP-8 Hydrant Pit and Lids.*** Upgrade existing hydrants that do not meet American Petroleum Institute (API) standards, and improve worker safety and working conditions.
- ***Vernal Pool Restoration Phase 2.*** Mitigate for past and future threatened and endangered species habitat impacts as well as restore areas to be used toward future mitigation requirements.
- ***Construct Visitor Center Main Gate.*** Improve AT/FP for the base, streamline driver and security pass processing, and improve safety conditions for visitors to the base.
- ***Pollution Prevention (P2) Rock Crusher.*** Clean up and recycle concrete and asphalt piles and foundations, comply with Public Resources Code 40191, and correct a notice of violation from the Yuba County Environmental Health Department.
- ***Construct Flightline Centralized Parking South Access Road.*** Increase AT/FP in the vicinity of the flightline and improve and control vehicular traffic in the vicinity of flightline infrastructure and facilities.
- ***Construct Gas Service Station, Auto Hobby Shop, and Car Wash.*** Provide a second service station on the base, and provide personnel on the base with a controlled area to service their own vehicles.
- ***Erosion Control at Upper Blackwelder Lake.*** Repair extensive erosion and downstream sedimentation at the western end of Upper Blackwelder Lake, and remove all concrete debris that has been placed into the two southwestern drainages to stop this erosion from advancing.

- ***Erosion Control at Miller Lake.*** Repair extensive erosion and downstream sedimentation at Miller Lake Dam, improve the integrity of the dam, and repair unsafe conditions.
- ***Erosion Control at Lower Blackwelder Dam.*** Repair extensive erosion and downstream sedimentation at Lower Blackwelder Lake Dam, improve the integrity of the dam, and repair unsafe conditions.
- ***Repair Force Protection at Recce Point Club.*** Comply with AT/FP standards that require parking to be sufficient distance from all critical facilities and infrastructure.

This EA has been prepared to satisfy the requirements of NEPA (Public Law [P.L.] 91-190, Title 42; United States Code [U.S.C.], Section 4321 et seq.), as amended. NEPA legislated a structured approach to environmental impact analysis that requires Federal agencies to use an interdisciplinary and systematic approach in their decision making process. This process evaluates potential environmental consequences associated with a proposed action and considers alternative courses of action. The intent of NEPA is to protect, restore, and enhance the environment through well-informed Federal decisions. In addition, this document has been prepared in accordance with Air Force Instruction (AFI) 32-7061, *Environmental Impact Analysis Process* (EIAP), as set forth in Title 32 Code of Federal Regulations [CFR] Part 989, which implements Section 102(2) of NEPA and regulations established by the Council on Environmental Quality (CEQ).

### 1.3 Assessment Approach

The types of activities included in the WINDO plan involve site preparation; construction of new facilities; facility upgrades, repair and alterations of existing facilities and base infrastructure; replacement and expansion of facilities; landscaping, storm drainage system, sewer system and other utilities maintenance and upgrades; AT/FP activities; and demolition of facilities. All projects programmed for implementation during Fiscal Year (FY) 2004 through 2006 have undergone or will undergo EIAP for the WINDO effort. All WINDO would be within the boundaries of Beale AFB. There are three categories of actions evaluated during WINDO EIAP:

- ***Approved Projects.*** NEPA analysis is complete. These projects either qualified as a CATEX or were analyzed in another EA. Although not part of this Proposed Action, they might be referenced in this EA because they would occur within the same timeframe as the Proposed Action and are germane to the evaluation of cumulative environmental impacts.
- ***Concurrent Projects.*** NEPA evaluation is ongoing. These projects are being analyzed in another EA. Although not part of this Proposed Action, they might be referenced in this EA because they

would occur within the same timeframe as the Proposed Action and are germane to the evaluation of cumulative environmental impacts.

- **Proposed Projects.** NEPA analysis will be discussed in this EA (WINDO Volume 2) or are being analyzed in another EA (WINDO Volume 1).

Eighty-eight projects were evaluated under the WINDO Implementation Plan. All WINDO Implementation Plan projects were verified to determine if they qualified for a categorical exclusion (CATEX), were evaluated in an EA with a signed Finding of No Significant Impact (FONSI), or are being evaluated in a separate EA. All projects not in these categories were determined to be proposed projects. All WINDO Implementation Plan projects were verified to determine if they qualified for a CATEX A2.3.11 of 32 CFR 989 Appendix B. This CATEX defines projects as ones that are similar to the same as other projects already evaluated in an EA with a signed FONSI. To expedite the EA timeline, those projects requiring further analysis in an EA were divided into two categories: (1) those projects with no potential to impact the 100-year floodplain, wetlands, or threatened and endangered species habitat (as analyzed in WINDO Volume 1); (2) and those projects potentially impacting 100-year floodplain, wetlands, or threatened and endangered species habitat (as analyzed in this EA, WINDO Volume 2). A list of all 88 WINDO Implementation Plan projects by FY, a map showing their general locations, and a brief project description are provided in Appendix A. Below is a summary of these 88 WINDO Implementation projects.

- |   |             |
|---|-------------|
| • Approved as a CATEX                             | 17 projects |
| • Approved as an EA with a signed FONSI           | 13 projects |
| • Proposed to qualify for a CATEX                 | 37 projects |
| • Proposed, evaluated in WINDO EA Volume 1        | 9 projects  |
| • Proposed, evaluated in this EA (WINDO Volume 2) | 12 projects |

## 1.4 Introduction to the Organization of this Document

The EA is organized into seven sections. Section 1 contains background information on Beale AFB, a statement of the purpose of and need for the Proposed Action, the WINDO assessment approach, and an introduction to the organization of the EA. Section 2 provides a detailed description of the Proposed Action, a description of the No Action Alternative, and discussion of alternatives considered but dismissed from further review. Section 3 contains a general description of the biophysical resources and baseline conditions that potentially could be affected by the Proposed Action or the No Action Alternative. Section 4 presents an analysis of the environmental consequences. Section 5 includes an analysis of the potential cumulative impacts on Beale AFB. Section 6 lists the preparers of the document. Section 7 lists the sources of information used in the preparation of the document. Appendix A includes a

list of all the WINDO projects at Beale AFB. Appendix B includes air quality emissions calculations for the Proposed Action. Appendix C includes a detailed list of all branchiopod habitat in the vicinity of the Proposed Action. Appendix D includes the Global Hawk LRE Cable Soil Report. Appendix E includes a detailed list of all jurisdictional waters of the U.S. impacted by the Proposed Action.

## 2.0 Proposed Action and Alternatives

This section describes those projects that are evaluated as part of this Proposed Action (WINDO Volume 2), discusses the No Action Alternative, and describes the alternatives that were considered but eliminated from further review.

### 2.1 Proposed Action

The Proposed Action consists of 12 projects. These 12 projects (construction, demolition, repair, and restoration) are listed in Table 2-1. Each of these projects was determined to require analysis in an EA because of the scope of the project, magnitude of the action, and potential impacts on waters of the U.S. and threatened and endangered species habitat and other resource areas associated with the Proposed Action. All of these projects are planned in four main land use areas of the base: Flightline, Main Base, Open Space, and Water. An overview of all 12 project locations is shown in Figure 2-1.

**Table 2-1. Projects Analyzed in this EA**

<b>Program FY</b>	<b>Project Title</b>	<b>Project Number</b>	<b>Project Type</b>	<b>Area Disturbed</b>
2004	Construct Heritage Park <sup>1</sup>	050007 Ref. No. 41	QOL	402,588 ft <sup>2</sup> 9.24 acres
2004	Install Global Hawk LRE Cables <sup>1</sup>	040021 Ref. No. 42	O&M	6,307 ft <sup>2</sup> 0.14 acres
2004	Upgrade JP-8 Hydrant Pits and Lids <sup>2</sup>	030013 Ref. No. 31	DESC	149,215 ft <sup>2</sup> 3.43 acres
2004	Vernal Pool Restoration Phase 2 <sup>1</sup>	NA Ref. No. 43	ENV	11,164,350 ft <sup>2</sup> 26.73 acres
2004	Construct Visitor Center Main Gate <sup>1</sup>	040041 Ref. No. 24	AT/FP	2,011 ft <sup>2</sup> 0.05 acres
2005	P2 Rock Crusher <sup>2</sup>	NA Ref. No. 67	ENV	1,401,486 ft <sup>2</sup> 32.17 acres
2005	Construct Flightline Centralized Parking South Access Road <sup>2</sup>	030122 Ref. No. 49	AT/FP	553,617 ft <sup>2</sup> 12.71 acres
2005	Construct Gas Service Station, Auto Hobby Shop, and Car Wash <sup>2</sup>	NA Ref. No. 68	AAFES	88,824 ft <sup>2</sup> 1.87 acres
2005	Erosion Control at Upper Blackwelder Lake <sup>1</sup>	007046AA Ref. No. 59	ENV	626,144 ft <sup>2</sup> 12.49 acres
2005	Erosion Control at Miller Lake <sup>1</sup>	007032 Ref. No. 57	ENV	131,841 ft <sup>2</sup> 3.03 acres
2005	Erosion Control at Lower Blackwelder Dam <sup>1</sup>	057031 Ref. No. 58	ENV	377,260 ft <sup>2</sup> 8.66 acres
2006	Repair Force Protection at Recce Point Club <sup>2</sup>	030125 Ref. No. 78	AT/FP	368,309 ft <sup>2</sup> 8.46 acres

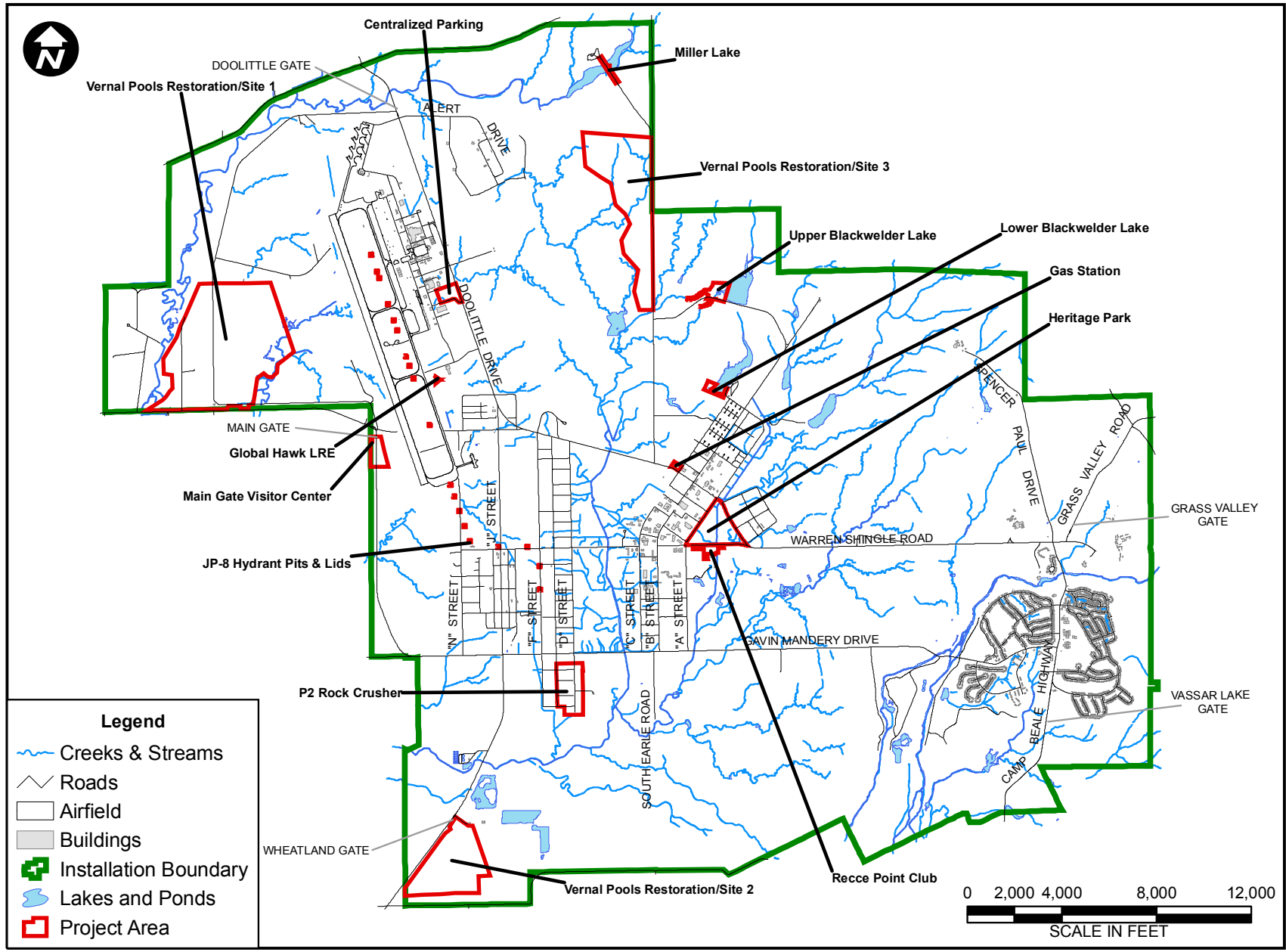
Notes: <sup>1</sup> Project would impact wetlands.

<sup>2</sup> Project is adjacent to wetland; however, project would not impact these wetlands.

ft<sup>2</sup> – square feet NA – Not applicable



Figure 2-1. WINDO Project Locations on Beale AFB



The above 12 proposed projects are within or adjacent to wetlands, floodplains, and threatened and endangered species habitat. However, through the EA process and regulatory consultation and site visits the base was able to revise many of the project designs and significantly reduce potential impacts to wetlands, floodplains, and threatened and endangered species habitat.

***Construct Heritage Park.*** The acreage between A Street, Warren Shingle Road, and Doolittle Drive has been set aside within the General Plan for development of a park (Figure 2-2). The park would function as an attractive gathering place for group events and central display of the mission and environmental heritage that has defined Beale AFB. Heritage Park would be constructed over a series of phases, which include the following:

- Construction of a static display, green belt, and transition zone to include a pedestrian plaza, amphitheater, concrete foundations for displaying small and large aircraft, public restrooms, flag poles, and shade sail awnings; and installation of associated utilities (electric, water, irrigation, and sewer).
- Construction of paved perimeter walkways, information kiosks, wooden foot bridges, and decomposed granite footpaths leading to educational stations that feature aspects of the local environment and Beale AFB history.
- Construction of a fenced play area with playground equipment and a picnic area equipped with tables, benches, and barbeque grills.

***Install Global Hawk LRE Cables.*** An LRE area was constructed west of Fire Station 1 to support the Global Hawk mission. Within the LRE, there are three Differential Global Positioning System (DGPS) antennas. Mobile Global Hawk equipment connects to these DGPS antennas randomly throughout the year as part of mission requirements. Therefore, the base proposes to install three antenna cable lines to areas within the LRE (Figure 2-3). The trenches for these cables would be approximately 6 inches wide and 6 inches below ground surface. The trenches would be constructed using a walk-behind chain trencher, which could disturb a path up to 18 inches wide. Approximately 925 feet of trenches would be required to install these three antenna cables.

After construction, all trenches would be filled with the removed soil and revegetated and the project area would be restored to conditions prior to construction activities. All disturbed seasonal wetlands outside the project area would be flagged and orange fencing would be placed restricting access to these areas. In

***THIS PAGE INTENTIONALLY LEFT BLANK***



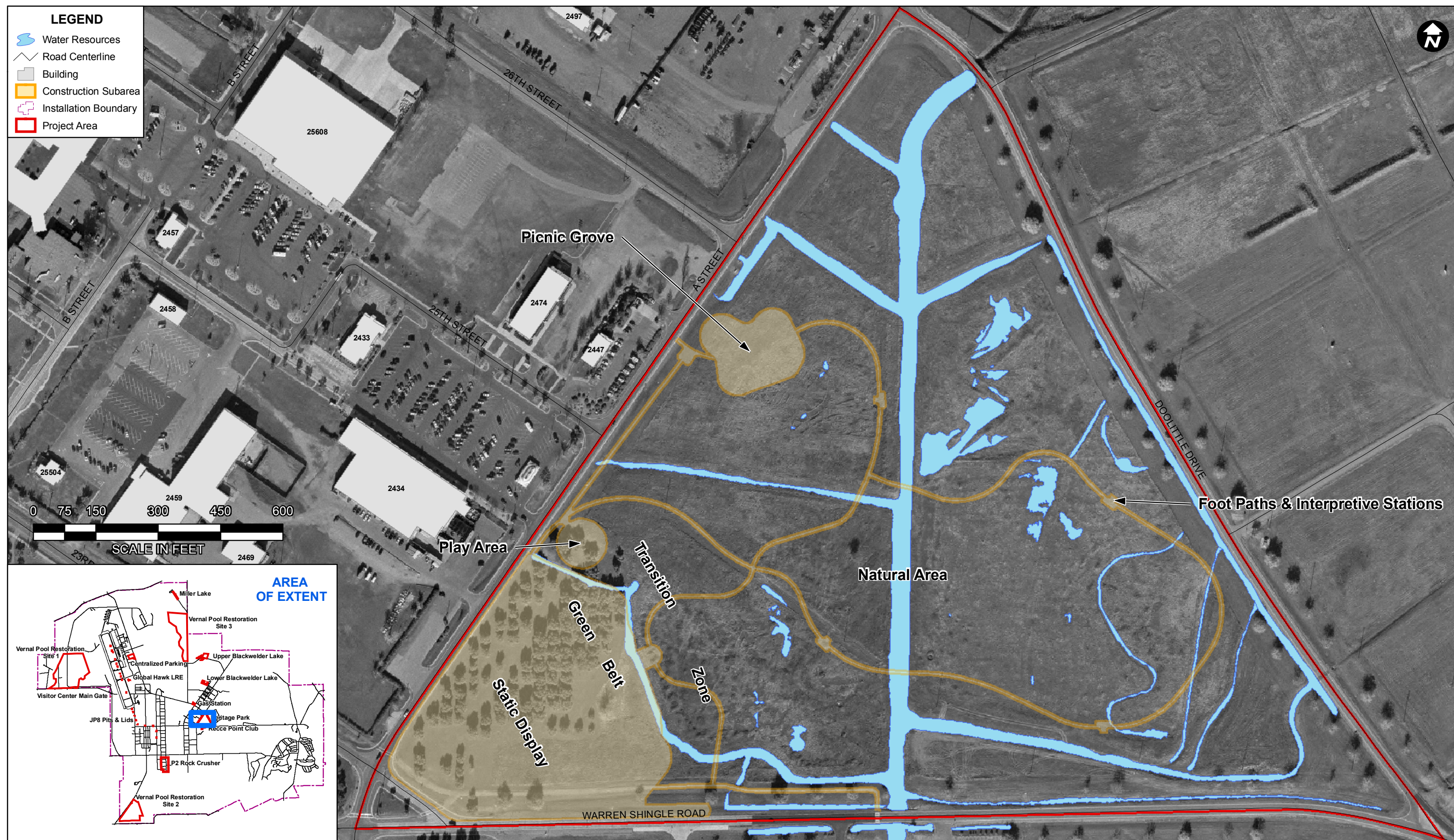
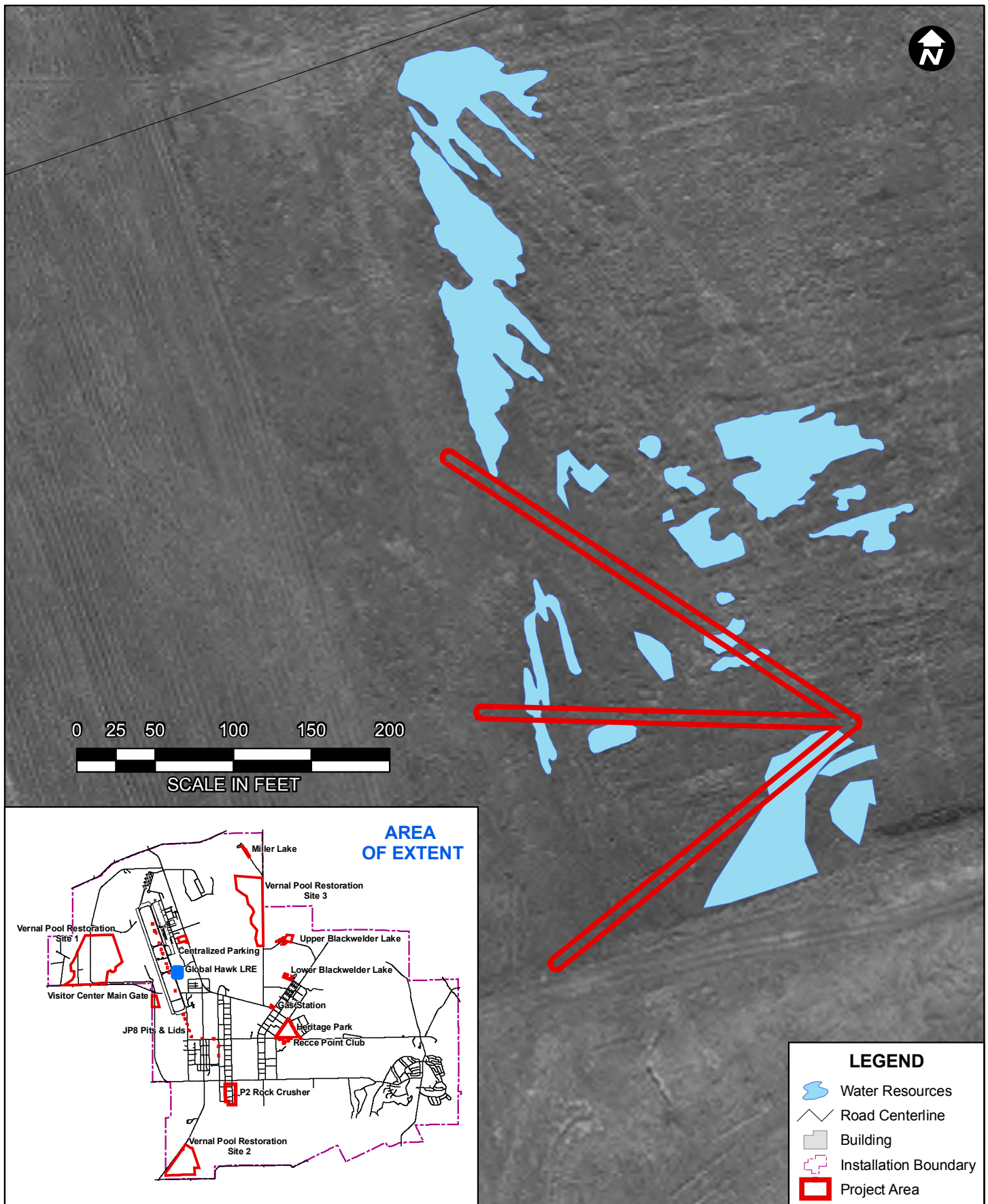


Figure 2-2. Construct Heritage Park



***THIS PAGE INTENTIONALLY LEFT BLANK***



**Figure 2-3. Install Global Hawk LRE Cables**

order to protect these disturbed seasonal wetlands from potential impacts from construction activities, the trench lines would be backfilled with the removed soil material and compacted. The project area would also be restored by revegetating the site with native seeds.

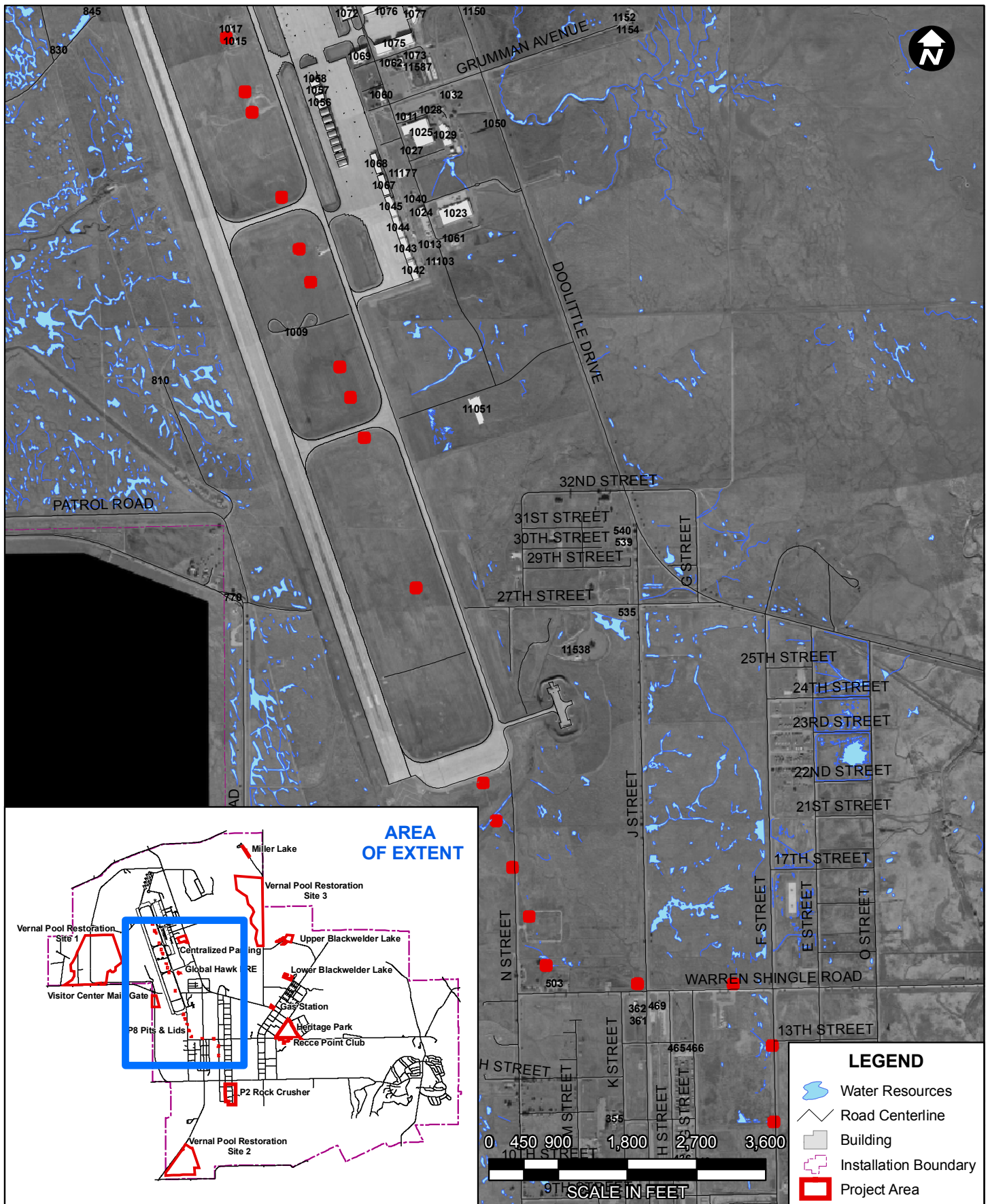
***Upgrade JP-8 Hydrant Pits and Lids.*** The fuel hydrant pipeline is approximately 3.5 miles long and conveys JP-8 jet fuel from the Bulk Fuels storage area at the southern end of the pipeline to the flightline at the northern end. This pipeline has approximately 19 pits and lids along its length. These pits are required to house any threaded or bolted connections on the line and allow for inspection of these connections. Many of these pits house connections for low-point drains and high-point air release valves, and others house bolted connections and valves in the pipeline. These connections require periodic inspections, which can be laborious and often require confined space entry procedures. In addition, water intrusion has been a problem in pits with valves and in-line fittings and some of the pit bottoms are cracked. Existing hydrants do not meet API standards and require replacement or rebuilding. Several pits do not have hydrants installed. Therefore, the base proposes to replace 19 hydrant pits and lids with API-approved units to allow ease of inspections and prevent potential water intrusion (Figure 2-4). This project would also correct 12 airfield obstructions by bringing the pits and lids to grade.

The project would involve the following:

- Shutdown pipeline until project completion. A detailed pipeline shutdown plan would be approved prior to commencing construction activities.
- Cut the existing concrete taxiway and excavate and remove all 19 pits and lids.
- Install upgraded, water-tight pit and lid assemblies and 19 upgraded hydrant pits.
- Provide 8 hydrant couplers for installation onto fuel carts.
- Decommission 16 inactive hydrant outlets.

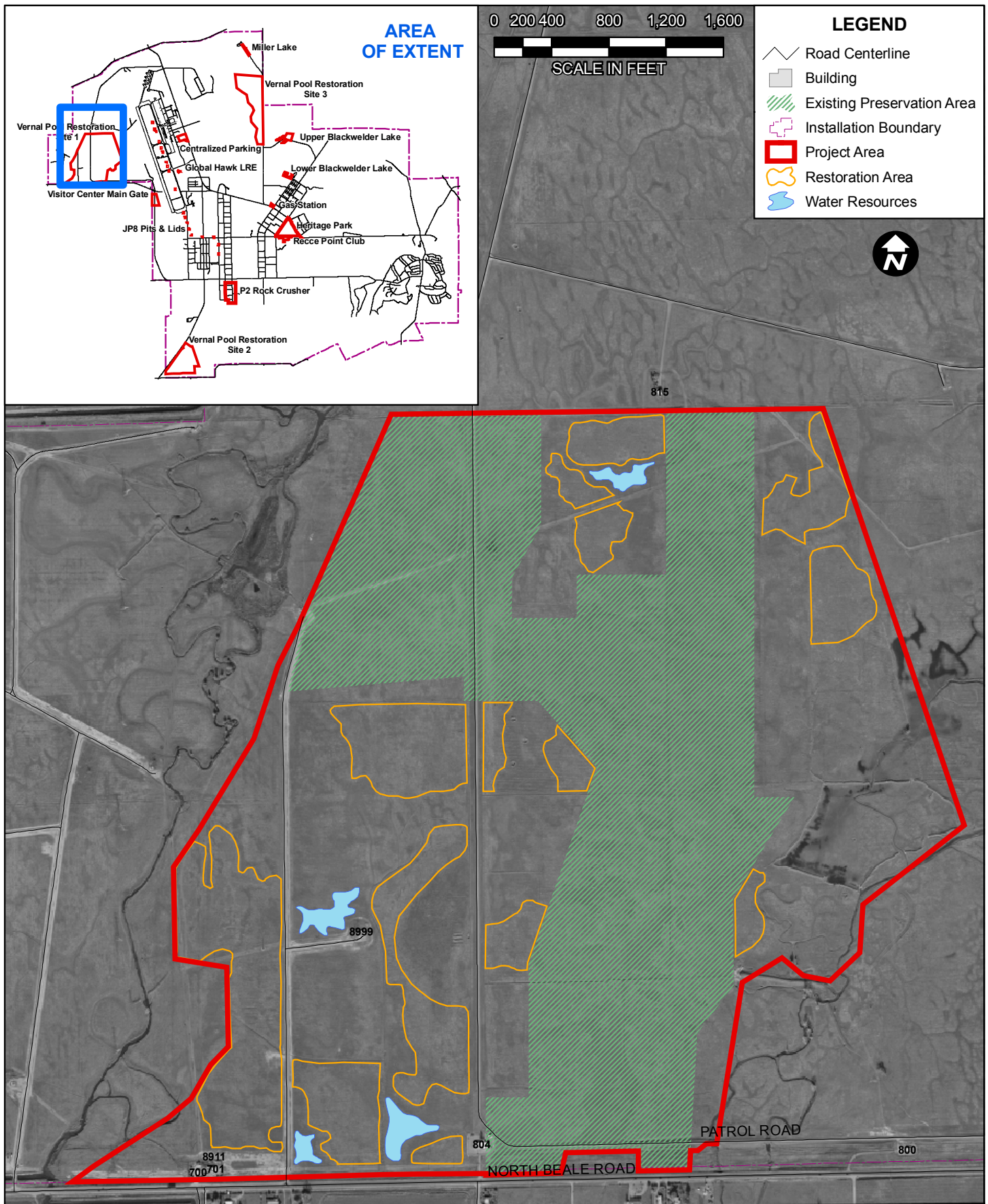
***Vernal Pool Restoration Phase 2.*** In 2001, Beale AFB implemented the first phase of onsite vernal pool restoration to serve as mitigation for past and future project impacts on threatened and endangered species habitat. This action was analyzed in the *Environmental Assessment Vernal Pool Restoration Beale Air Force Base, California* (BAFB 2001a). This EA provided detailed background information and site selection criteria and details on the overall plan of onsite mitigation at Beale AFB.

This project would involve constructing approximately 9.56 acres of vernal pool/swale complexes at three locations (Figures 2-5 to 2-8). The constructed vernal pools would consist of shallow depressions with an average depth of 10 inches and an average size of 0.2 to 0.3 acres. Most of the constructed vernal pools



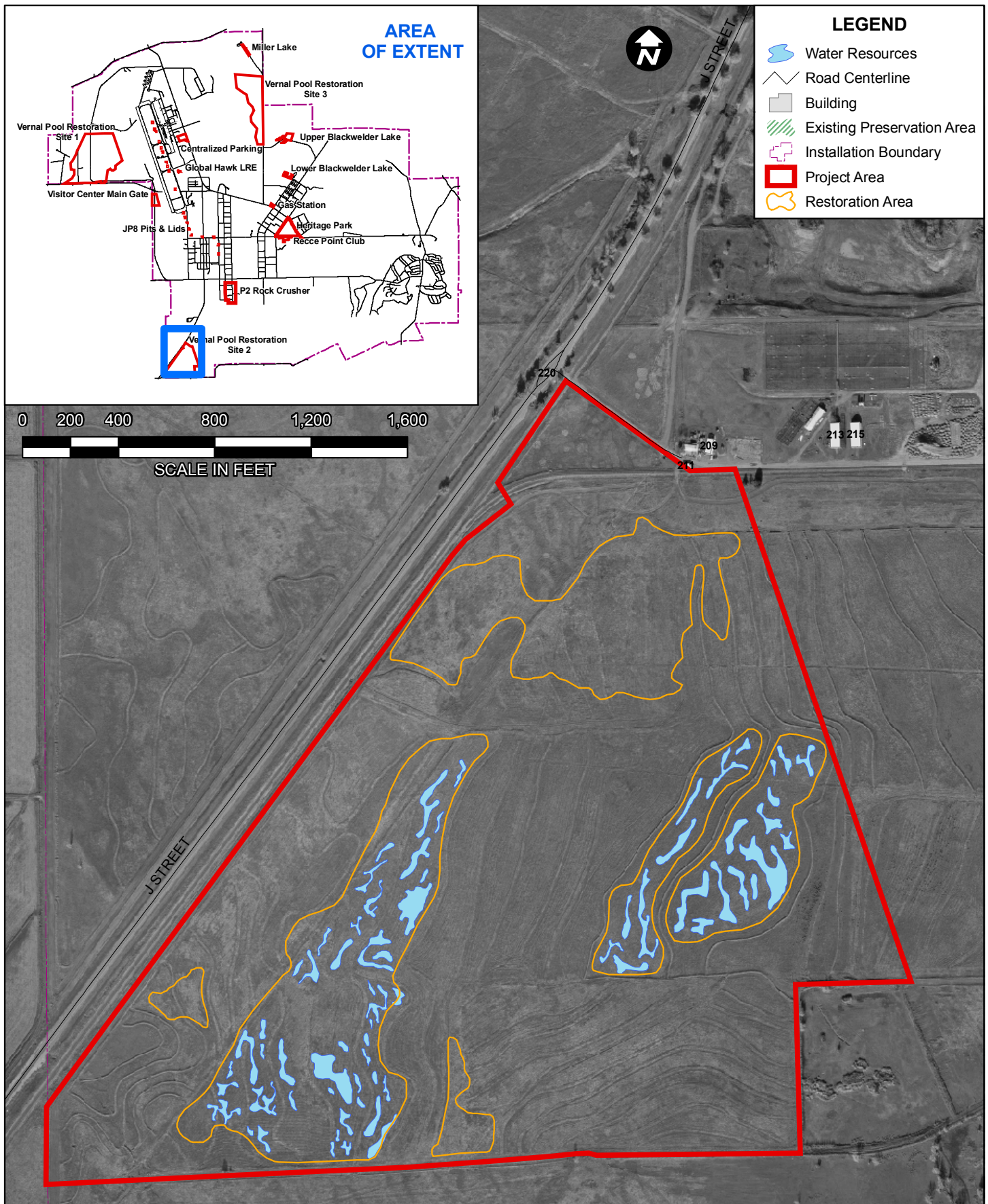
**Figure 2-4. Upgrade JP-8 Hydrant Pits and Lids**



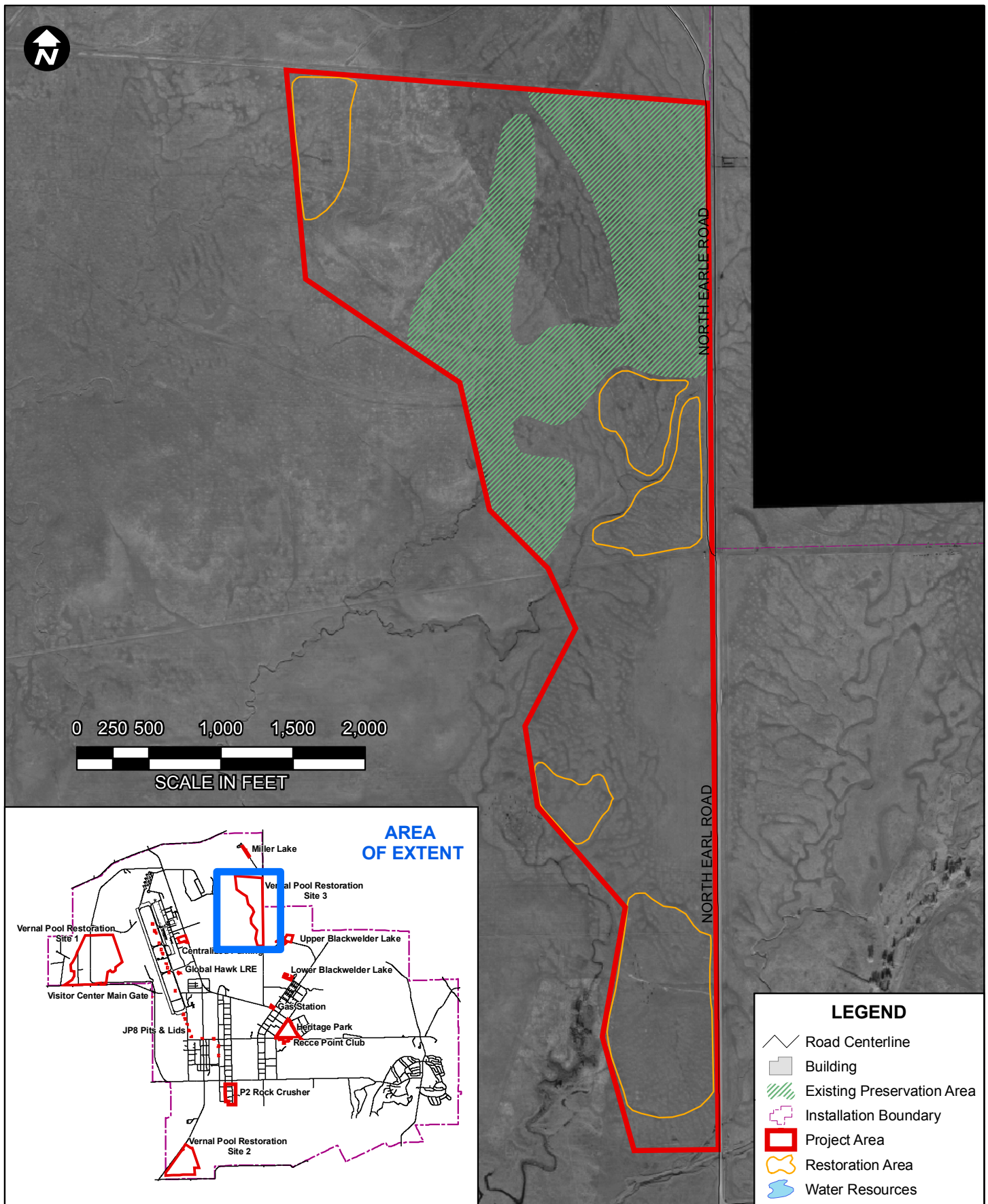


**Figure 2-5. Vernal Pool Restoration Phase 2/Site 1**



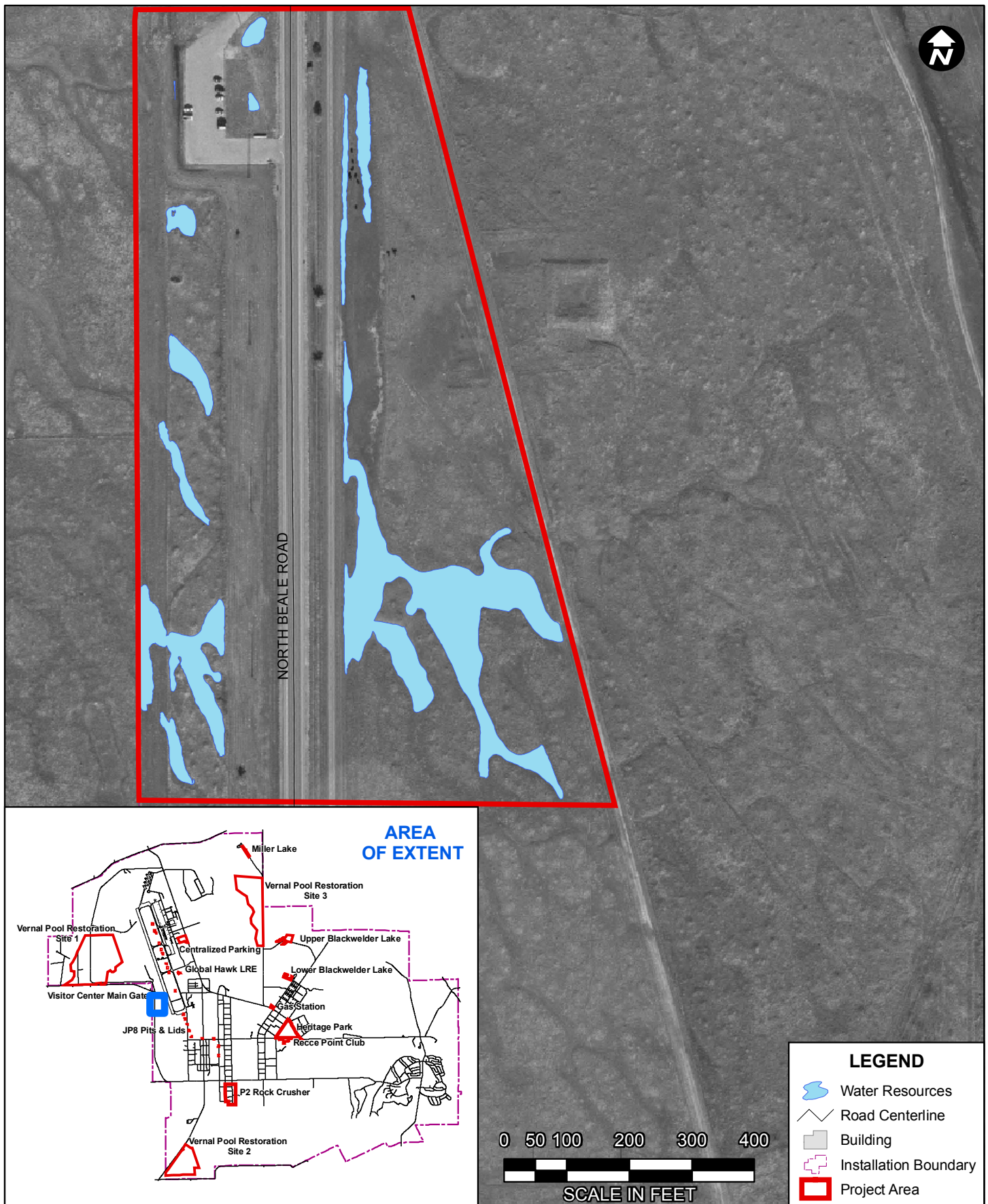


**Figure 2-6. Vernal Pool Restoration Phase 2/Site 2**



**Figure 2-7. Vernal Pool Restoration Phase 2/Site 3**





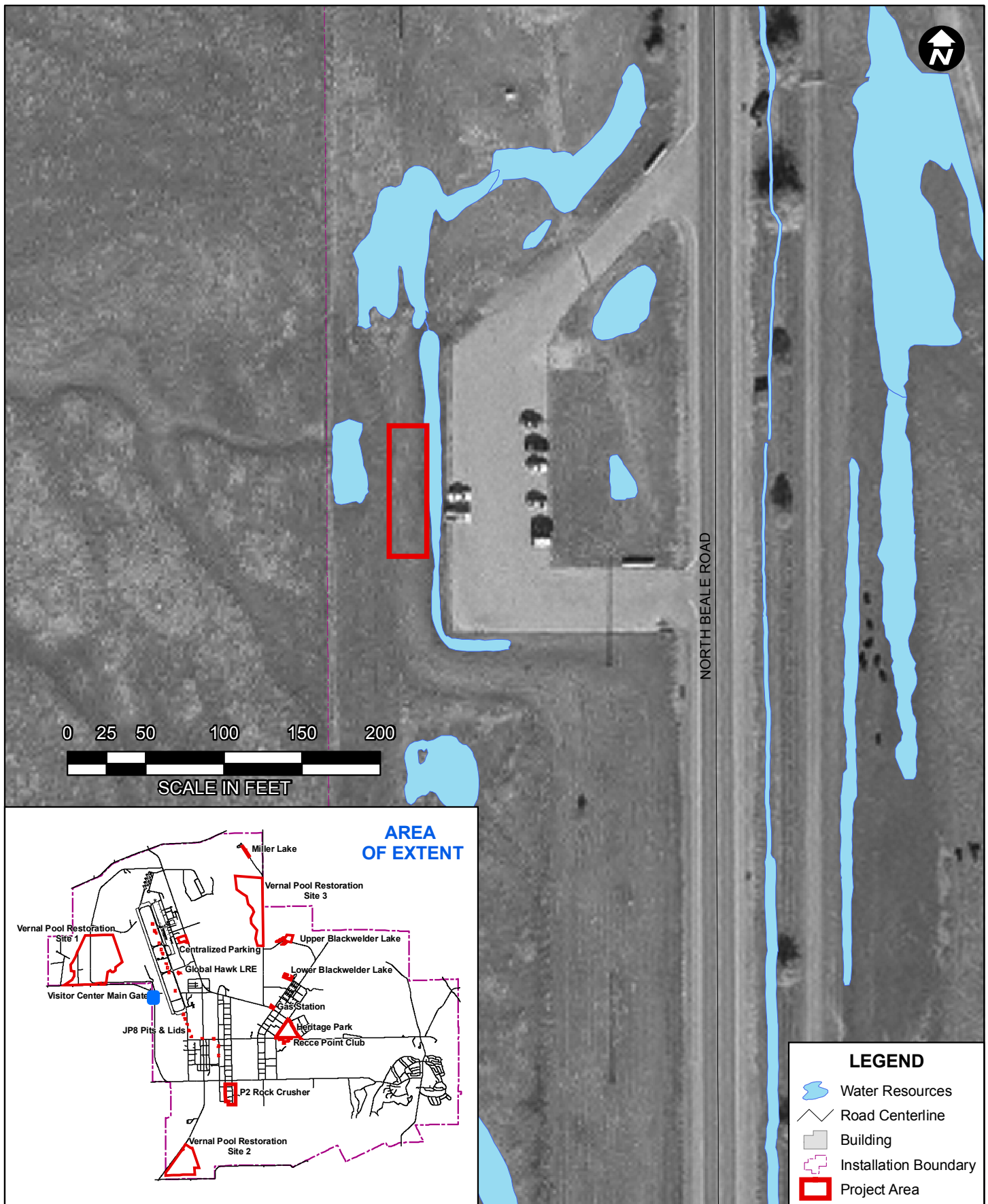
**Figure 2-8. Vernal Pool Restoration Phase 2/Inoculum Collection Near Main Gate**

would function as individual entities, but a small portion of these pools would be hydrologically connected with adjacent pools by vernal pool swales that would also be constructed as part of this project. Spoil material from the vernal pool excavations would be deposited adjacent to the pools in such a way that allows the creation of upland habitat. Vernal pool inoculums for the created and enhanced vernal pools would be collected from existing pools on Beale AFB that are within 0.5 miles of the project area.

**Construct Visitor Center Main Gate.** Visitors to the base currently must obtain visitor's driving and security passes at one of five entry gates. Most of these permits are processed at the Main Gate guard house. The Main Gate guard house has limited space for processing visitors, and visitors must walk across busy traffic lanes to access the existing guard house. A new Main Gate entry control point is planned for construction in FY 2005. The base currently does not have a formal visitor center. Therefore, the base proposes to construct a visitor center near the Main Gate (Figure 2-9). The project would involve (1) constructing a 1,000 square foot (ft<sup>2</sup>) visitor center west of the existing Driving Under the Influence Parking Lot off North Beale Road, and (2) demolishing the existing Main gate guard house.

**P2 Rock Crusher.** Approximately 20,000 cubic yards (yd<sup>3</sup>) of predominantly concrete and some asphalt have been stockpiled south of Gavin Mandery Drive between E Street and the Rod and Gun Club. In addition, this area includes remains of 64 concrete foundations from a German prisoner of war camp built in the 1940s. In July 1994, the base received correspondence from the Yuba County Environmental Health Department that this concrete and debris could be stockpiled if it was intended for reuse and future circulation. In September 2001, the base received another correspondence from Yuba County.

Environmental Health Department stating that since no action had been completed to reuse this material, the area fell under the definition of a "solid waste" per Public Resources Code 40191. This code prohibits disposing of solid waste in an unauthorized manner. The base was given a date of 31 December 2005 to dispose of this material. The P2 rock-crushing project is a cleanup/recycling project that would remove 139 piles of concrete and asphalt (1.39 acres) and 64 foundations (0.80 acres) from the project area by crushing the material and reusing it for base construction projects (Figure 2-10). The stockpiles and foundations would be disposed of using a rock crusher. The rock crusher would only be at the project site until the project is completed. The contractor would not excavate below ground surface when removing the debris piles. The foundations range between 18 to 24 inches below ground surface and also include surface walls and fallen debris. Therefore, only surface walls and debris would be removed during this project and the foundations would remain in place. After removal of the debris piles and surface foundation materials, the site would then be improved by restoring wetlands.



**Figure 2-9. Construct Visitor Center Main Gate**

***THIS PAGE INTENTIONALLY LEFT BLANK***



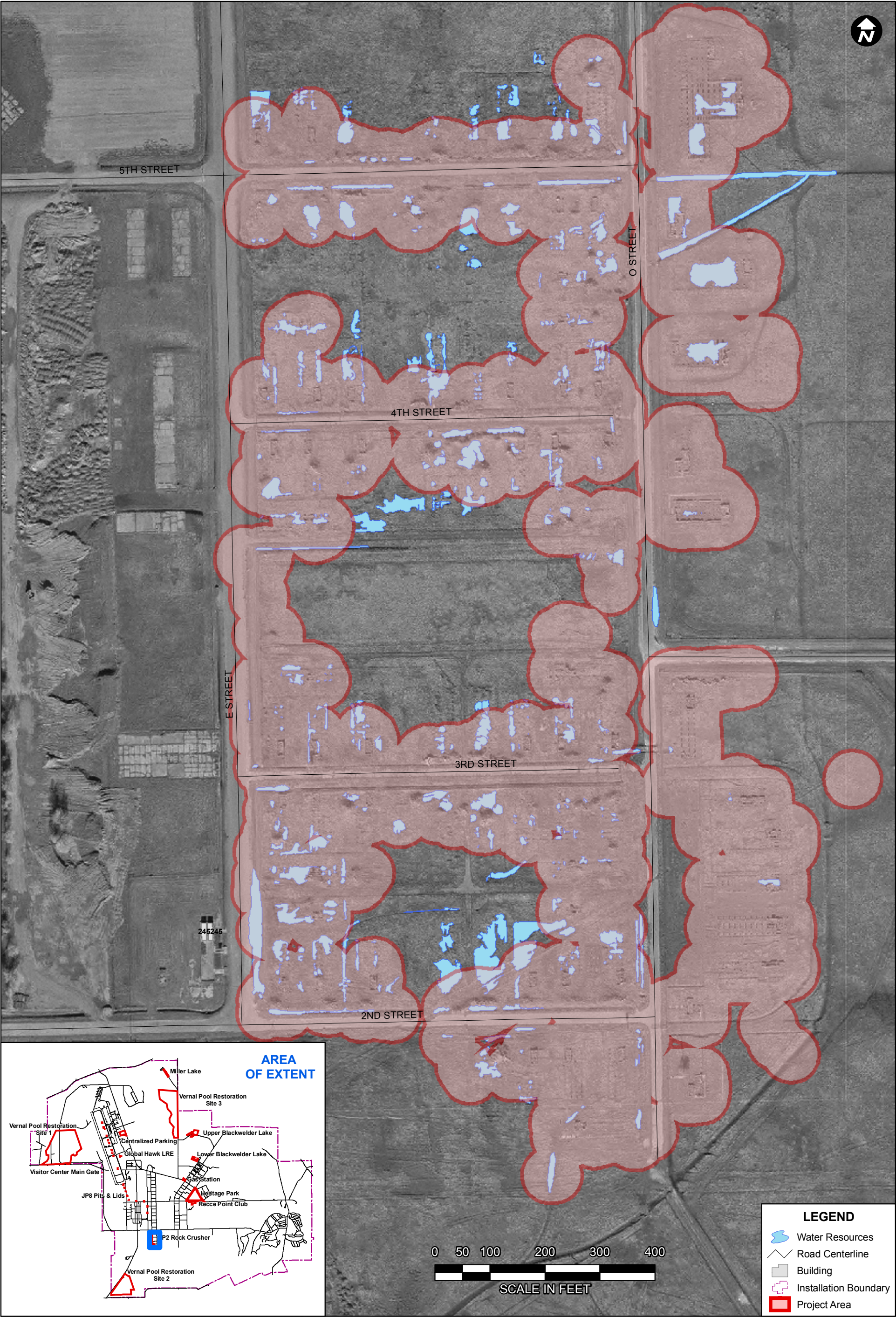


Figure 2-10. P2 Rock Crusher

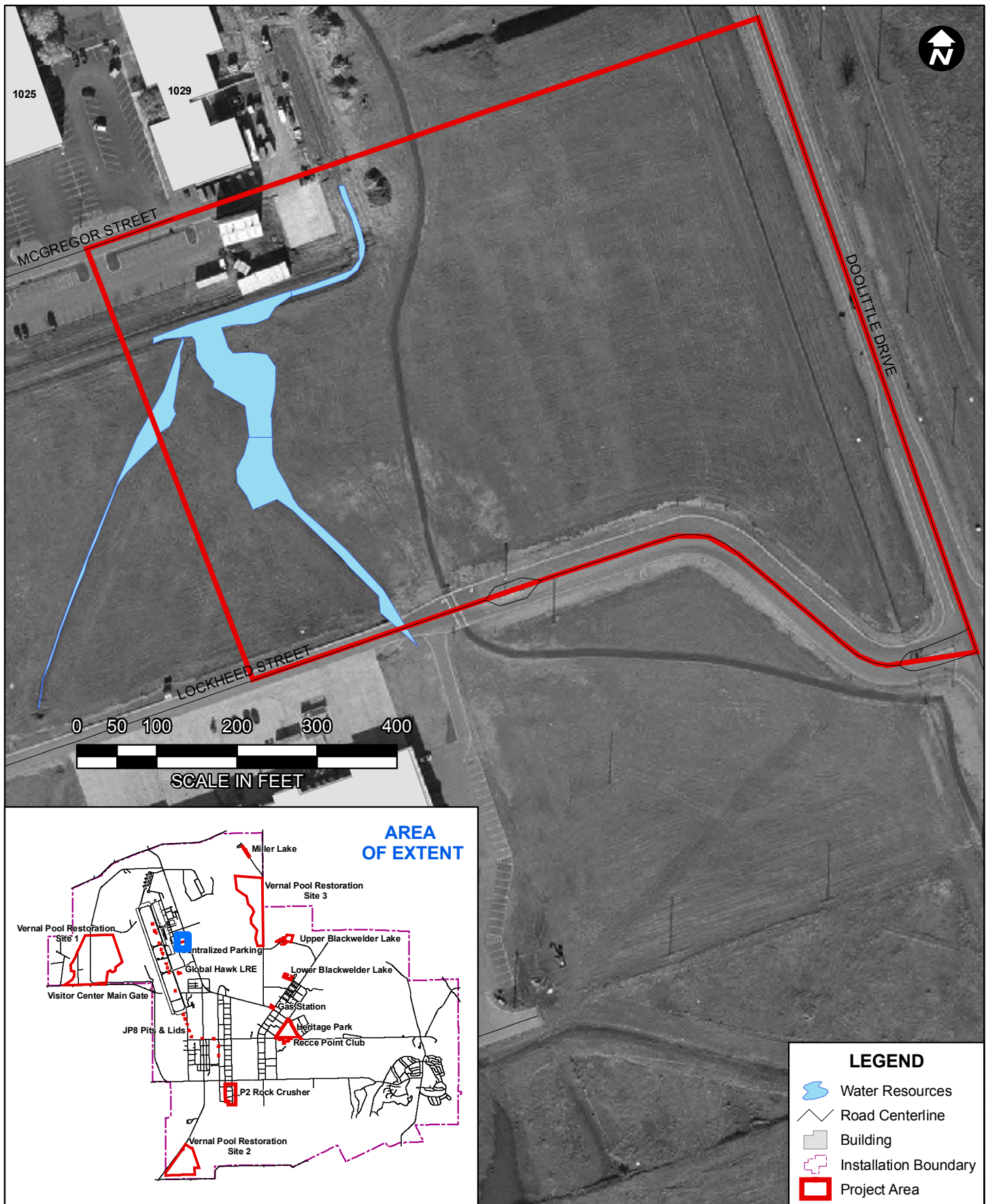


***THIS PAGE INTENTIONALLY LEFT BLANK***

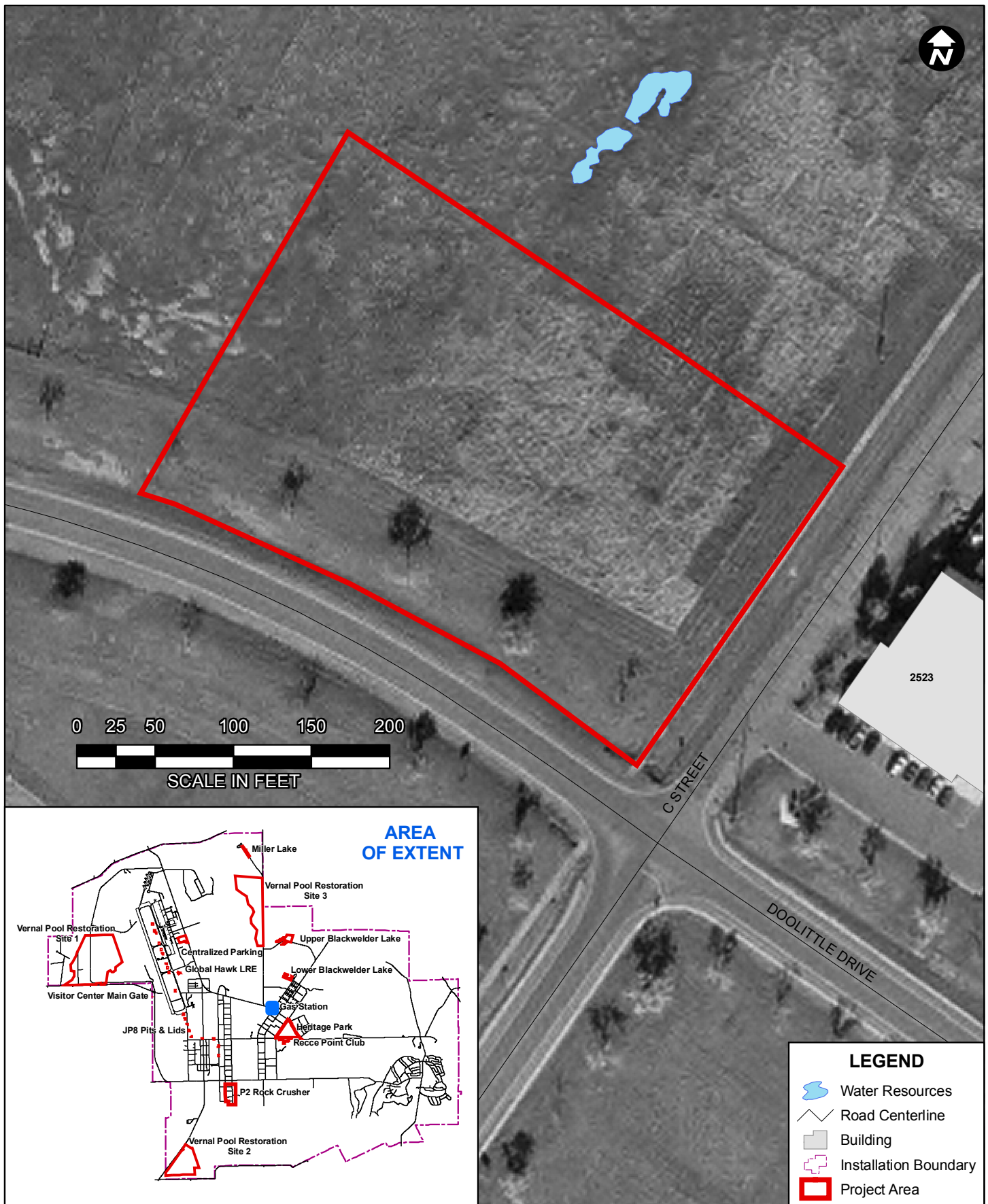
***Construct Flightline Centralized Parking South Access Road.*** The base proposes to increase security in the vicinity of the flightline. A centralized parking area has been constructed south of Building 1025 so that all flightline workers and visitors can park in one centralized parking area and then be transported to their designations. Currently, traffic must travel on existing roadways that are in close proximity or within the flightline area to access this parking lot. Therefore, a new access road is required to connect Doolittle Drive with this new parking lot while avoiding secure areas. The base proposes to construct a two-lane, paved roadway that would connect the new parking lot with Doolittle Drive and install a culvert under this proposed roadway where it would cross a drainage area (Figure 2-11). This new access road would provide higher security control of the flightline area by making all traffic travel to the parking lot via one route.

***Construct Gas Service Station, Auto Hobby Shop, and Car Wash.*** The base proposes to construct a 8,652-ft<sup>2</sup> service facility, which would include an auto hobby shop, gasoline service station and pumps, and 900-ft<sup>2</sup> car wash (Figure 2-12). This facility would be at the intersection of Doolittle Drive and C Street. The proposed project area is undeveloped, previously disturbed land and is centrally located within the Main Base area. The proposed project site was chosen because it provides clear access to main transportation routes, and because the site was previously disturbed. In addition, there is an overgrown asphalt parking lot on the project site.

***Erosion Control at Upper Blackwelder Lake.*** Upper Blackwelder Lake is a 31-acre water body on the north-central portion of the base and lies within an area designated as Beale AFB Storm Water Basin No. 3. The lake is fed by surface runoff and two tributaries that drain north to south, including Hutchinson Creek. The normal pool elevation of the lake is controlled by a concrete spillway and culvert system located in the southeast portion of the lake. During the winter season, Upper Blackwelder Lake is inundated with storm water runoff that has caused erosion of a drainage channel southeast of the lake. The topographic low spot on the southwestern quadrant of the lake has the same elevation as the spillway. Consequently, water also flows out of the lake at this site and into two drainage swales and culverts under adjacent roadways. There is extensive evidence of soil erosion and downstream sedimentation in this low area. Therefore, the USAF proposes to construct concrete spillways, grade and repair erosion areas, and grout and abandon existing culverts at the southwestern location of the lake (Figure 2-13). These systems would be constructed at a higher elevation than the existing spillway/culvert system to eliminate and control further erosion of these areas.



**Figure 2-11. Construct Flightline Centralized Parking South Access Road**

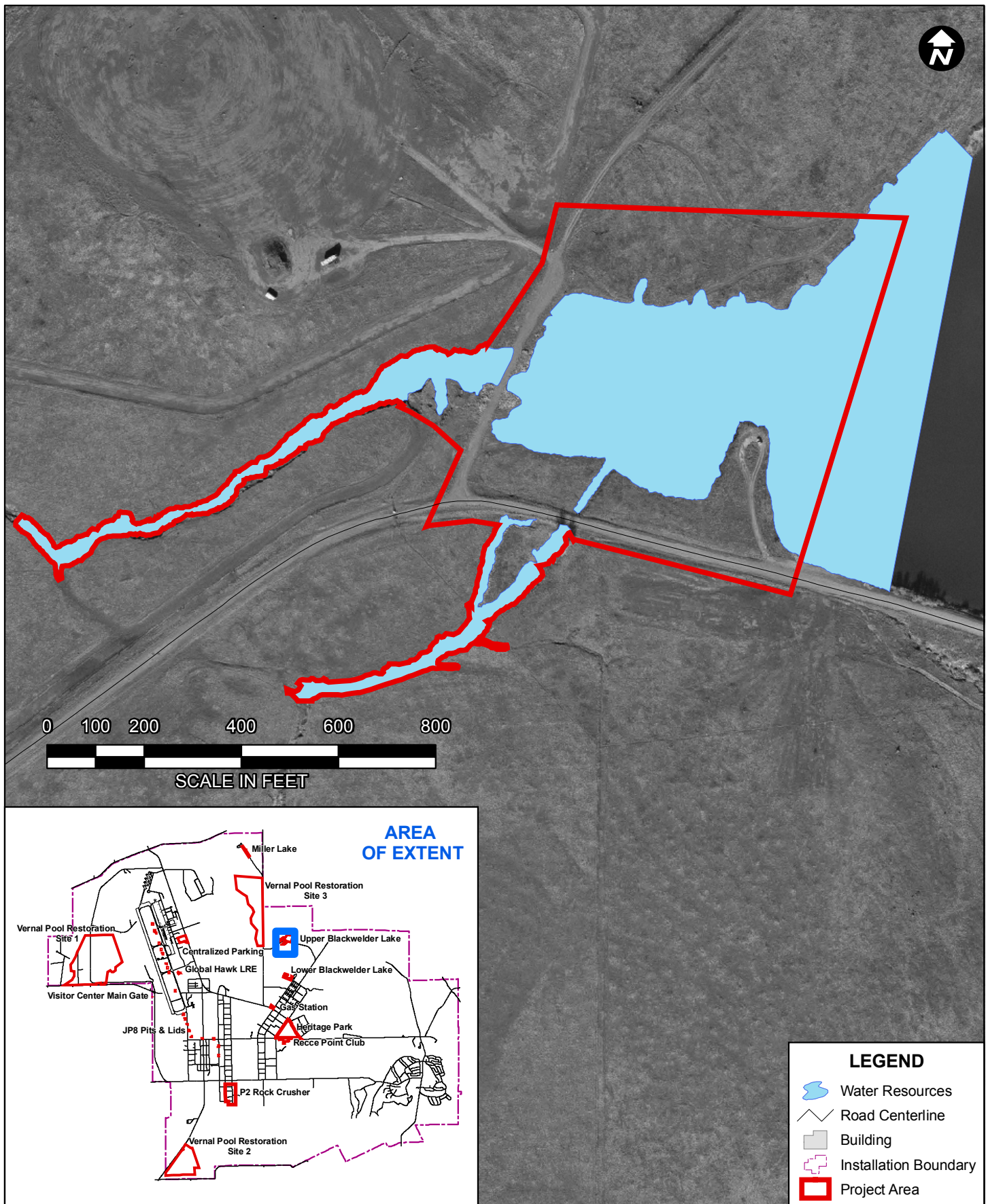


**Figure 2-12. Construct Gas Service Station, Auto Hobby Shop, and Car Wash**

EA of WINDO Implementation Plan  
(FY 04-06) at Beale AFB, CA Volume 2

2.0 Proposed Action and Alternatives  
August 2005





**Figure 2-13. Erosion Control at Upper Blackwelder Lake**

The project would involve the following:

- Install two concrete spillways that would be integrated with the existing roadways. Each spillway would be trapezoidal-shaped, 60 feet wide, and approximately 2.5 feet below the top of the roadway. These spillways are only for emergency overflow and heavy rain events.
- Grade and compact the areas upstream and downstream from these concrete spillways and protect these areas from future erosion with 8-inch or larger rip-rap.
- Grout and abandon the existing culverts in the area of the proposed spillways.
- Grade the areas surrounding the spillways to reroute the storm water runoff to the main control outlet. Drainage from Upper Blackwelder Lake would still use the main control outlet for the majority of its storm water runoff.

As part of this design, water would flow over the spillways when the normal pool elevation of Upper Blackwelder Lake is greater than 97 feet above mean sea level. Areas surrounding the spillways and the rip-rap would require regular maintenance to allow longevity of their use. The areas surrounding the spillways and rip-rap would be inspected after the first few rain events to determine if any water is building up in certain areas. In addition, the main control outlet would be maintained regularly to be free of woody debris. This would ensure that the Upper Blackwelder Lake storm water drainage system fully uses the main control outlet during normal storm events.

***Erosion Control at Miller Lake.*** Miller Lake is a 46-acre water body in the upper central portion of the base and lies within Beale AFB Storm Water Basin No. 1. The lake is fed by surface runoff and Reeds Creek. Miller Dam appears to have sufficient deficiencies that could develop into unsafe conditions and affect the integrity of the dam. Primarily, there are safety issues related to overtopping, seepage and piping, erosion, and slope stability. The U.S. Army Corps of Engineers (USACE) sent an inspection team to Miller Dam in July 2004 to evaluate the problems at Miller Dam and provide recommendations to correct these problems.

The USACE inspection identified the following problems at Miller Dam:

- Erosion on the upstream face of the dam is mostly confined to the mid-section of the dam and around the control tower. A well-worn path leading from the crest to the waterside was found that could lead to additional sediment runoff and erosion gullies. Severe erosion was found around the control tower including a large scour hole approximately 15 feet wide and 6 feet deep.

- A large depression of approximately 20 feet in diameter was discovered on the downstream slope in the area above the outlet pipe. This depression could lead to removal of the subsurface embankment material through the process of piping.
- Several holes and cavities were found in the area of the downstream outlet pipe. The extent and source of these holes and cavities are unknown at this time because of heavy vegetation in the area.
- Heavy vegetation comprised of grasses, willow trees, and shrub species occurs on the high waterline and toe of the dam. This could lead to internal erosion conditions that would affect the safety of the dam or create potential habitat for burrowing animals.

The USACE inspection team recommended the following corrective measures for Miller Dam (Figure 2-14):

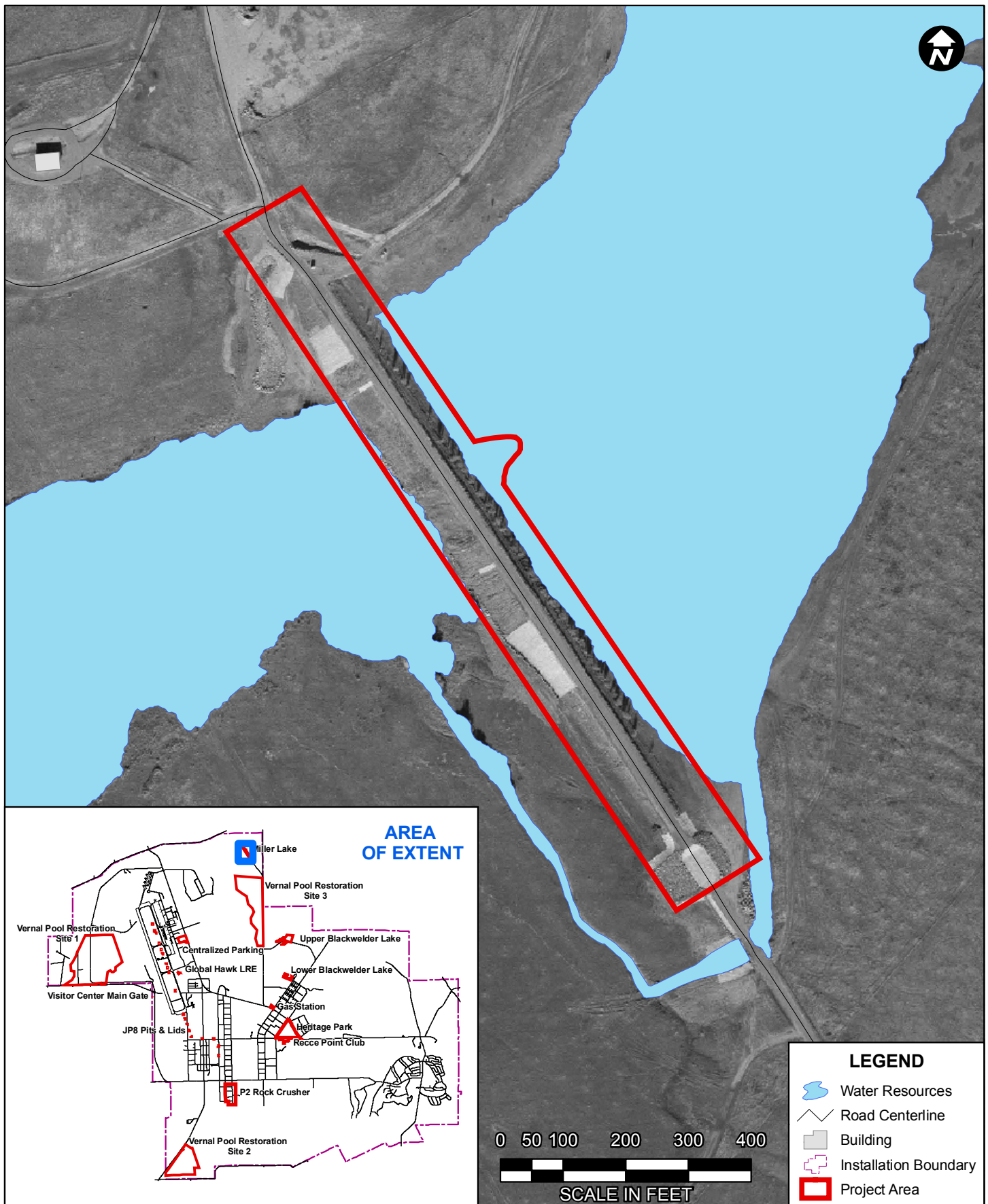
- Remove all loose debris from the scour hole around the control tower and backfill with a “flowable” material. An engineering backfill such as low-strength material might be appropriate and would aid in filling the void around the outlet pipe.
- Clear all excessive vegetation along upstream and downstream slopes for identification of soil cavities and depressions. Additionally, install a downstream weir and implement a seepage monitoring program that tracks the quantity and turbidity.
- Conduct more frequent inspections and monitor problems at Miller Dam.
- Conduct geotechnical exploration and laboratory testing to include soil borings, testing disturbed and undisturbed soil samples, and determining the condition of the outlet pipe.

***Erosion Control at Lower Blackwelder Lake.*** Lower Blackwelder Lake is a 21-acre water body located on the north-central portion of the base adjacent to Main Base and lies within Beale AFB Storm Water Basin No. 3. The lake is fed by surface runoff and Hutchinson Creek. Lower Blackwelder Lake is draining and has many erosion problems. Therefore, the base proposes to discover the source of the water loss and repair erosion problem areas (Figure 2-15).

The project would involve the following:

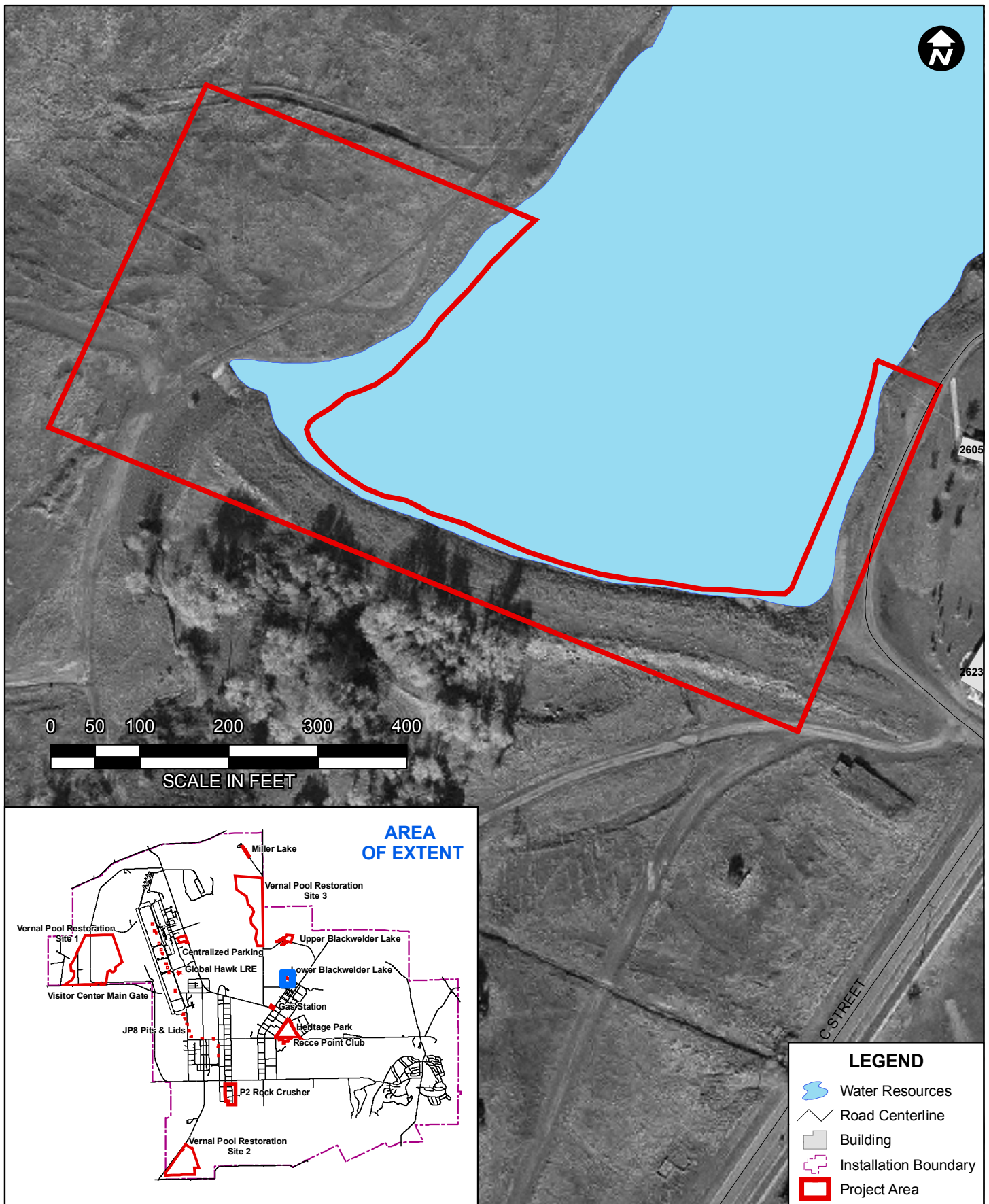
- Fill holes and sink holes with slurry mix and repair overflow problem.
- Burn brush on the dam.
- Repair rodent holes.
- Clean and maintain the project area.





**Figure 2-14. Erosion Control at Miller Lake**





**Figure 2-15. Erosion Control at Lower Blackwelder Lake**

***Repair Force Protection at Recce Point Club.*** Currently, parking areas adjacent to Recce Point Club do not meet AT/FP setback distances from critical infrastructure and facilities. This project is required to comply with USAF AT/FP guidelines and requirements. Therefore, the base proposes to demolish these existing parking areas surrounding Recce Point Club and construct new parking areas that comply with USAF AT/FP guidelines and requirements (see Figure 2-16). The proposed parking areas would be constructed adjacent to existing parking areas within undeveloped land. Since this project would cross an existing riverine area, this project would use the existing wooden bridges for pedestrians to access Recce Point Club and the golf course driving range.

## **2.2 No Action Alternative**

***Construct Heritage Park.*** The proposed park would provide a space for large gatherings, ceremonies, and presentations for the base. The proposed park is also a key component of the base master plan that would ultimately create a sustainable Main Base area that would support future base missions. If Heritage Park is not developed, an improved pedestrian circulation and potential for public gathering area would not exist on base, therefore, perpetuating a fragmented development area on Main Base.

***Install Global Hawk LRE Cable.*** The proposed LRE cables would not be installed. Therefore, the base would not be able to support the Global Hawk mission, potentially impacting national security.

***Upgrade JP-8 Outlet Pits and Lids.*** If a leak occurs along the pipeline, it could go undetected for an extended period of time and eventually lead to soil and water contamination. Safety of operations and maintenance personnel would be jeopardized due to the unsafe working conditions and confined spaces.

If hydrants are not installed in pits without hydrants, fuel operations could be compromised during emergency conditions due to shortage of fueling stations. If hydrants are not installed in pits with hydrants, the pits would continue not to meet API standards.

***Vernal Pool Restoration Phase 2.*** Vernal pools would not be restored at the proposed sites. Past actions on Beale AFB required restoration or vernal pool areas to compensate for direct and indirect impacts on vernal pools. If the vernal pool areas are not restored, the base would not be in compliance with USACE and U.S. Fish and Wildlife Service (USFWS) restoration requirements and would be fined. In addition, future construction projects would be jeopardized if the base fails to complete this project. This could impact the base's ability to support new mission beddowns and other mission requirements that involve construction.



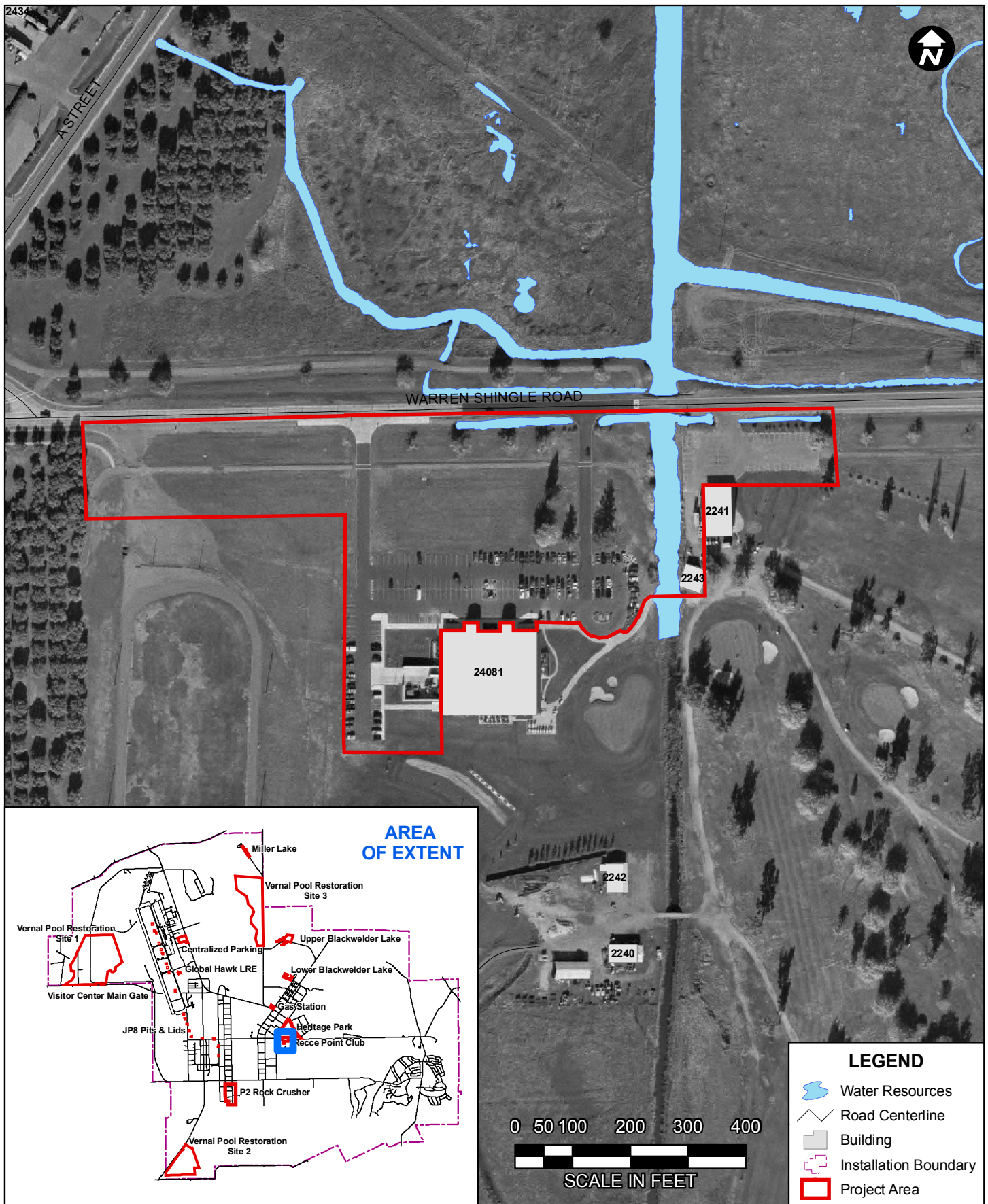


Figure 2-16. Repair Force Protection at Recce Point Club

**Construct Visitor Center Main Gate.** No visitor center would be constructed at the Main Gate. Beale AFB would continue to use the facilities and infrastructure at the Main Gate in the current condition and configuration. There would be no change from the existing conditions at the installation. This alternative would not address the security, safety, and traffic congestion requirements of the ACC and Beale AFB, nor the standards specified in USAF AT/FP guidelines and requirements.

**P2 Rock Crusher.** The concrete and asphalt debris piles and foundations would not be removed and crushed. This would not address the Notice of Violation from the Yuba County Environmental Health Department and Public Resources Code 40191. The project area would be considered an unauthorized landfill and the base would be subject to fines from Yuba County.

**Construct Flightline Centralized Parking South, Access Road.** Beale AFB would continue to operate the centralized flightline parking in its current condition and configuration. This alternative would not address the security and safety requirements of the ACC and Beale AFB, nor the standards specified in USAF AT/FP guidelines and requirements.

**Construct Gas Service Station, Auto Hobby Shop, and Car Wash.** The base would continue to dispense gasoline to privately owned vehicles (POVs) in its current condition. There is no POV car wash facility on base, and food service locations are limited. The No Action Alternative would not provide adequate food services to base personnel and visitors and POV owners would continue to wash their vehicles off base.

**Erosion Control at Upper Blackwelder Lake.** No erosion corrective measures would be implemented and erosion would continue unabated. Areas downstream of Upper Blackwelder Lake would continue to erode and function as source sediments, resulting in a decrease in water quality. Erosional gullies would continue to become more entrenched resulting in the loss of mineral soils and exposure of nutrient-poor substrate. The continued loss of mineral soils would reduce the biotic's ability to bind and retain sediments. Loss of the native flora would also provide an opportunity for exotic invasive plants to colonize the project area.

**Erosion Control at Miller Lake.** No erosion corrective measures would be implemented and erosion would continue unabated. Areas downstream of Miller Lake would continue to erode and function as source sediments, resulting in a decrease in water quality. Erosional problems at Miller Dam would continue to become more entrenched resulting in the loss of mineral soils and exposure of nutrient-poor substrate. Miller Dam would eventually become undermined and the roadway on top of the dam would become unsafe for vehicle traffic. The continued loss of mineral soils would reduce the biotic's ability to

bind and retain sediments. Loss of the native flora would also provide an opportunity for exotic invasive plants to colonize the project area.

***Erosion Control at Lower Blackwelder Dam.*** No erosion corrective measures would be implemented and erosion would continue unabated. Areas downstream of Lower Blackwelder Lake would continue to erode and function as source sediments, resulting in a decrease in water quality. Erosional problems at Lower Blackwelder Lake would continue to become more entrenched resulting in the loss of mineral soils and exposure of nutrient poor substrate. The continued loss of mineral soils would reduce the biotic's ability to bind and retain sediments. Loss of the native flora would also provide an opportunity for exotic invasive plants to colonize the project area.

***Repair Force Protection at Recce Point Club.*** Under the No Action Alternative, Beale AFB would continue to operate the Recce Point Club parking area in its current condition and configuration. There would be no change from the existing conditions at the installation. This alternative would not address the security and safety requirements of the ACC and Beale AFB, nor the standards specified in USAF AT/FP guidelines and requirements.

The No Action Alternative would not address USAF mission and force protection concerns at Beale AFB. However, inclusion of the No Action Alternative is prescribed by the CEQ regulations and, therefore, will be carried forward for further analysis in the EA.

## **2.3 Other Alternatives Considered But Eliminated From Further Review**

Other potential alternatives were considered in the early conceptual phases of the Proposed Action. However, they did not meet security and master plan requirements and financial or natural resource constraints.

***Construct Heritage Park.*** Alternative sites within the Main Base area were evaluated; however, no sites were large enough or they were already planned for future development.

***Install Global Hawk LRE Cables.*** Aboveground cables were initially considered. This was dismissed because of the frail-nature of these cables, the cost of replacing them if damaged, and the impact on the Global Hawk mission if these cables were out of commission.

***Upgrade JP-8 Hydrant Pits and Lids.*** Originally, the project design for upgrading the JP-8 outlet pits and lids included a 10-foot-wide, aggregate-covered maintenance road that would parallel the JP-8

pipeline. This roadway was eliminated because of the impacts on threatened and endangered species habitat and waters of the U.S. and unnecessary project costs.

***Vernal Pool Restoration Phase 2.*** Use of an offsite mitigation bank to provide creation and preservation compensation for the impacts on vernal pool habitat was considered as an alternative. This alternative was eliminated from consideration for the following reasons:

- Beale AFB has property with degraded vernal pools that would meet the regulatory criteria for onsite mitigation and could benefit the base by restoring its own natural resources.
- Use of an offsite mitigation bank would require another formal consultation with the USFWS and would delay the implementation of the project for more than 1 year.
- Offsite mitigation ratios would be higher, thus requiring more compensation acreage (restoration and preservation) than would be required for onsite mitigation.
- Costs per acre at an offsite mitigation bank are approximately \$70,000 to \$100,000 per acre while onsite costs for conducting the mitigation and long-term monitoring are approximately \$40,000 per acre.

***Construct Visitor Center Main Gate.*** Originally, the base proposed to construct a much larger visitor center south of the DUI parking area. This alternative was dismissed because of costs and because the site would have impacted more wetlands considered threatened and endangered species habitat.

***P2 Rock Crusher.*** Originally, the concrete foundations were proposed for complete removal and crushing. These foundations range from 18 to 24 inches below ground surface. Based on informal USFWS site visits and consultation, removing these foundations would compromise the wetlands considered as threatened and endangered species habitat for most of the project area. Therefore, this alternative was dismissed because of the costs, mitigation requirements, and impacts on wetlands considered threatened and endangered species habitat.

***Construct Flightline Centralized Parking South Access Road.*** Other adjacent properties along the flightline were considered to construct the parking lot and access road. However, these properties are programmed for future development or would impact wetlands considered threatened and endangered species habitat. Another alternative was considered to construct the parking lot and access road closer to Main Base and provide buses to transport workers to all flightline facilities. This alternative was dismissed because of long-term costs and because some flightline missions require short response times, which could affect the base mission.

***Construct Gas Service Station, Auto Hobby Shop, and Car Wash.*** The original concept associated with this project was approximately 3 acres. This design was dismissed because the design would have impacted two wetlands considered threatened and endangered species habitat.

***Erosion Control at Upper Blackwelder Lake.*** Originally, it was proposed to only repair the rip-rap on either side of the roadways where the two drainage cross. This alternative was dismissed because it was determined to be only a short-term fix and would not stop further erosion from future high rain events.

***Erosion Control at Miller Lake.*** Originally, it was proposed to only repair the large hole in the middle of the dam. This alternative was dismissed because it was determined to be only a short-term fix, would not stop further erosion, and would not repair the sink holes which are causing the lake to lose water storage capacity.

***Erosion Control at Lower Blackwelder Lake.*** Originally, it was proposed to only repair the dam at the southern end of the lake. This alternative was dismissed because it was determined to be only a short-term fix and would not stop further erosion from occurring.

***Repair Force Protection at Recce Point Club.*** Originally, the proposed parking lot concept included filling the riverine feature between Recce Point Club and the golf course driving range, installing a series of culverts to allow water flow, and paving over this area for additional parking. This alternative was dismissed because of costs and potential impacts to jurisdictional waters of the U.S.

## 3.0 Affected Environment

---

Section 3.0 describes the environmental and socioeconomic resources and conditions most likely to be affected by the Proposed Action. This section provides information to serve as a baseline from which to identify and evaluate environmental and socioeconomic changes likely to result from implementation of the Proposed Action. Baseline conditions represent current conditions. The potential environmental and socioeconomic impacts of the Proposed Action and No Action Alternative on the baseline conditions are described in Section 4.0.

In compliance with NEPA, CEQ guidelines, and 32 CFR Part 989, as amended, the description of the affected environment focuses on those resources and conditions potentially subject to impacts. Some environmental resources and conditions that are often analyzed in an EA have been omitted from this analysis. The following details the basis for such exclusions:

- **Land Use.** All activities associated with the Proposed Action would be consistent with present and foreseeable land use patterns at Beale AFB. Implementation of the Proposed Action would not significantly alter the existing land use at Beale AFB. Accordingly, the USAF has omitted detailed examination of land use.
- **Noise.** Implementation of the Proposed Action does not involve permanent alterations to aircraft inventories, operations, or missions. No new permanent ground-based heavy equipment operations are included in the Proposed Action. No activity included in the Proposed Action would result in a situation where residences would be impacted by an increase in present ambient noise levels. Furthermore, noise produced by construction and demolition activities associated with the Proposed Action would not significantly affect sensitive receptors. The closest sensitive noise receptors are more than 0.5 miles from the project areas. Accordingly, USAF has omitted detailed examination of noise.
- **Socioeconomics.** The Proposed Action does not involve any activities that would directly affect off-base activities, or directly or indirectly contribute to changes in socioeconomic resources. There would be no change in the number of personnel assigned to Beale AFB and no changes in area population or associated changes in demand for housing and services. Accordingly, USAF has omitted detailed examination of socioeconomics in this EA.
- **Environmental Justice.** The Proposed Action does not involve any activities that would contribute to changes in low-income or minority populations because all work would be



performed within the base boundary. Accordingly, USAF has omitted detailed examination of environmental justice.

### 3.1 Air Quality

Air quality in a given location is determined by the concentration of various pollutants in the atmosphere. National Ambient Air Quality Standards (NAAQS) are established by the U.S. Environmental Protection Agency (USEPA) for “criteria pollutants,” including ozone (O<sub>3</sub>), carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), particulate matter equal to or less than 10 microns in diameter (PM<sub>10</sub>), particulate matter equal to or less than 2.5 microns in diameter (PM<sub>2.5</sub>), and lead (Pb). NAAQS represent maximum levels of background pollution in the ambient air that are considered safe, with an adequate margin of safety to protect public health and welfare (see Table 3-1).

The California Environmental Protection Agency (Cal-EPA), California Air Resources Board (CARB) has delegated responsibility for implementation of the Federal Clean Air Act (CAA) and California CAA to local air pollution control agencies. The Proposed Action is in the Feather River Air Quality Management District (FRAQMD) and is subject to rules and regulations developed by the FRAQMD.

The State of California adopted the NAAQS and promulgated additional State Ambient Air Quality Standards (SAAQS) for criteria pollutants. The California standards are more stringent than the Federal primary standards. Table 3-1 presents the primary and secondary NAAQS and SAAQS that apply to air quality in California.

Under the General Conformity Rule, the CAA prohibits Federal agencies from performing projects that do not conform to a USEPA-approved State Implementation Plan (SIP). In 1993, USEPA developed final rules for how Federal agencies must determine air quality conformity prior to implementing a proposed Federal action. Under these rules, certain actions are exempt from conformity determinations, while others are assumed to be in conformity if total project emissions are below *de minimis* levels established under 40 CFR 93.153. Total project emissions include both direct and indirect emissions caused by the Federal action.

USEPA classifies the air quality in an air quality control region (AQCR) or in subareas of an AQCR according to whether the concentration of criteria pollutants in ambient air exceeds the primary or secondary NAAQS. All areas within each AQCR are therefore designated as either “attainment,” “nonattainment,” or “unclassified” for each of the six criteria pollutants. Attainment means that the air

**Table 3-1. National and California Ambient Air Quality Standards**

<b>Pollutant</b>	<b>Standard Value</b>	<b>Standard Type</b>
<b>CO</b>		
8-hour Average	9 ppm (10 mg/m <sup>3</sup> )	National Primary and CA
1-hour Average	35 ppm (40 mg/m <sup>3</sup> )	National Primary
1-hour Average	20 ppm (23 mg/m <sup>3</sup> )	CA
<b>NO<sub>2</sub></b>		
Annual Arithmetic Mean	0.053 ppm (100 µg/m <sup>3</sup> )	National Primary and Secondary
1-hour Average	0.25 ppm (470 µg/m <sup>3</sup> )	CA
<b>O<sub>3</sub></b>		
1-hour Average	0.12 ppm (235 µg/m <sup>3</sup> )	National Primary and Secondary
8-hour Average	0.08 ppm (157 µg/m <sup>3</sup> )	National Primary and Secondary
1-hour Average	0.09 ppm (180 µg/m <sup>3</sup> )	CA
<b>Pb</b>		
Quarterly Average	1.5 µg/m <sup>3</sup>	National Primary and Secondary
Monthly Average	1.5 µg/m <sup>3</sup>	CA
<b>PM<sub>10</sub></b>		
Annual Arithmetic Mean	50 µg/m <sup>3</sup>	National Primary and Secondary
24-hour Average	150 µg/m <sup>3</sup>	National Primary and Secondary
Annual Arithmetic Mean	20 µg/m <sup>3</sup>	CA
24-hour Average	50 µg/m <sup>3</sup>	CA
<b>PM<sub>2.5</sub></b>		
Annual Arithmetic Mean	15 µg/m <sup>3</sup>	National Primary and Secondary
Annual Arithmetic Mean	12 µg/m <sup>3</sup>	CA
24-hour Average	65 µg/m <sup>3</sup>	National Primary and Secondary and CA
<b>SO<sub>2</sub></b>		
Annual Arithmetic Mean	0.030 ppm (80 µg/m <sup>3</sup> )	National Primary
24-hour Average	0.14 ppm (365 µg/m <sup>3</sup> )	National Primary
3-hour Average	0.50 ppm (1,300 µg/m <sup>3</sup> )	National Secondary
1-hour Average	0.25 ppm (655 µg/m <sup>3</sup> )	CA
24-hour Average	0.04 ppm (105 µg/m <sup>3</sup> )	CA

Source: CARB 2003

Notes:

Concentration expressed first in units in which it was promulgated. Equivalent concentrations are given in parentheses.

CA – California

ppm – parts per million

mg/m<sup>3</sup> – milligrams per cubic meter

µg/m<sup>3</sup> - micrograms per cubic meter

quality within an AQCR is better than the NAAQS, nonattainment indicates that air quality exceeds NAAQS, and an unclassifiable air quality designation by USEPA means that there is not enough information to appropriately classify an AQCR, so the area is considered in attainment.

The General Conformity Rule requires that any Federal action meet the requirements of a SIP or Federal Implementation Plan (FIP). More specifically, CAA Conformity is assured when a Federal action does not cause a new violation of the NAAQS, contribute to an increase in the frequency or severity of violations of NAAQS, or delay the timely attainment of any NAAQS, interim progress milestones, or other milestones toward achieving compliance with the NAAQS.

The General Conformity Rule applies only to actions in nonattainment or maintenance areas and considers both direct and indirect emissions. The rule applies only to Federal actions that are considered “regionally significant” or where the total emissions from the action meet or exceed the *de minimis* thresholds. An action is regionally significant when the total nonattainment pollutant emissions exceed 10 percent of the AQCR’s total emissions inventory for that nonattainment pollutant. If a Federal action does not meet or exceed the *de minimis* thresholds and is not considered regionally significant, then a full Conformity Determination is not required.

Beale AFB is in Yuba County, which is within the Sacramento Valley Intrastate AQCR. FRAQMD is responsible for implementing and enforcing state and Federal air quality regulations in Yuba County, Sutter County, and portions of the Northern Sacramento Valley Air Basin (NSVAB). The air quality in the FRAQMD has been characterized by USEPA as a *moderate* transitional nonattainment area for O<sub>3</sub> and unclassifiable/attainment for all other criteria pollutants (USEPA 2005). The air quality in the FRAQMD has been characterized by CARB as a *moderate* nonattainment area for O<sub>3</sub>, a nonattainment area for PM<sub>10</sub>, and unclassifiable/attainment for all other criteria pollutants (CARB 2005).

## 3.2 Biological Resources

Biological resources include native or naturalized plants and animals and the habitats (i.e., wetlands, forests, and grasslands) in which they exist. Sensitive and protected biological resources include plant and animal species listed as threatened or endangered by the USFWS.

The 9th Civil Engineering Squadron/Environmental Flight (9 CES/CEV) has developed an Integrated Natural Resources Management Plan (INRMP) for Beale AFB (BAFB 1999). The INRMP was developed to use as a tool in managing the natural resources found on the base. Most of the information below was obtained from the Beale AFB INRMP. Habitat communities on Beale AFB are shown in Figure 3-1.

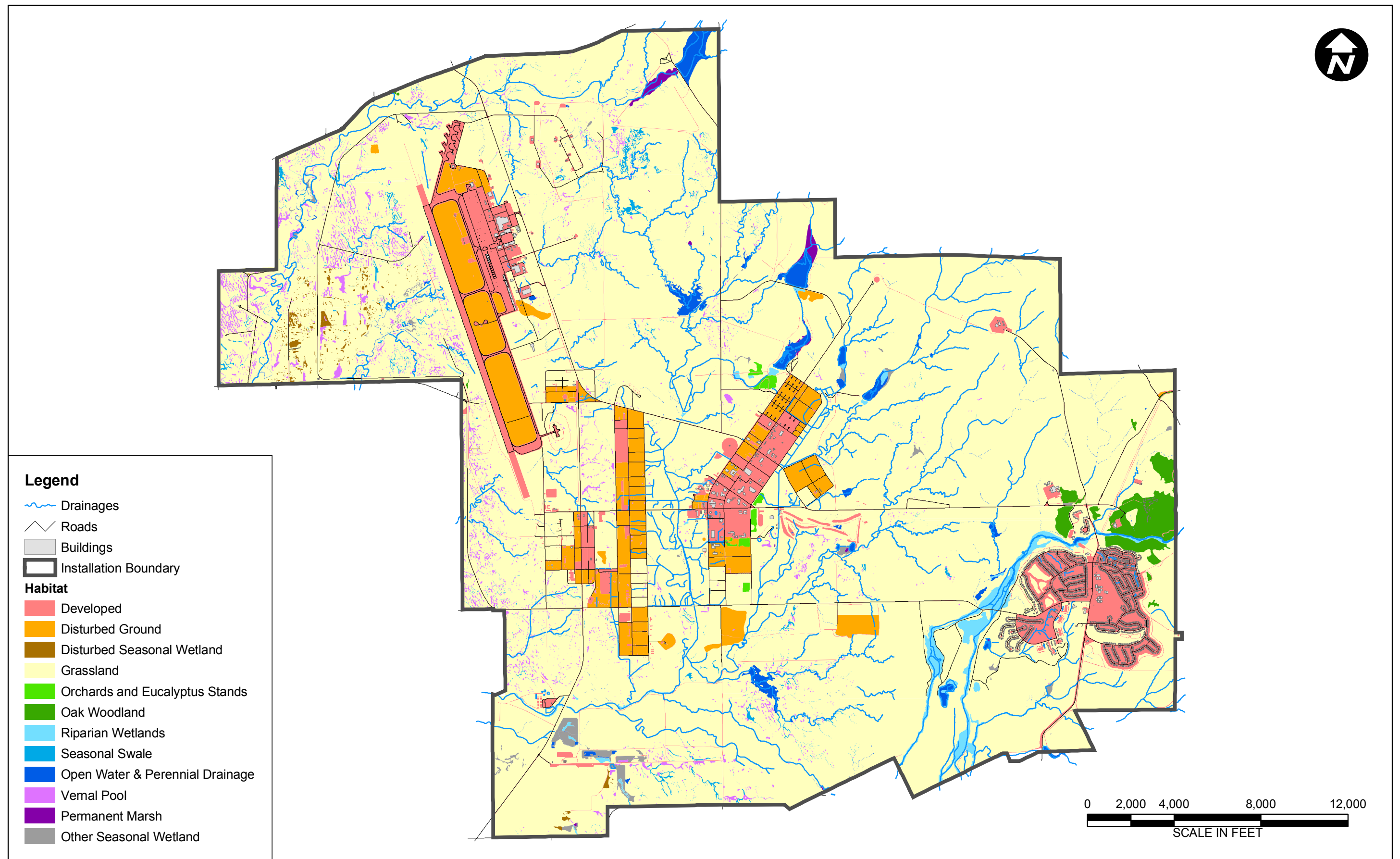


Figure 3-1. Habitat Types on Beale AFB

***THIS PAGE INTENTIONALLY LEFT BLANK***

This section describes the following aspects of the affected environment:

- Annual grasslands
- Wetland resources
- Special-status species

Information in this section is based on plant and wildlife surveys conducted from December 2004 to March 2005, a search of the California Department of Fish and Game's California Natural Diversity Database (CNDDDB), previous environmental documents done for the project areas, and the following wetland delineations:

- *Delineation of Waters of the United States for Areas Potentially Included in the Habitat Conservation and Management Plan for Beale Air Force Base* (Jones & Stokes 2001).
- *Repair of the JP-8 Fuel Hydrant Transfer Pits Jurisdictional Delineation Report* (URS 2005).
- *Beale Air Force Base Anti-Terrorism/Force Protection Upgrades Wetland Delineation Report* (Foothill 2004).
- *Wing Infrastructure Development Outlook Wetland Delineation Report* (e<sup>2</sup>M 2005).
- *Beale Air Force Base Supplemental Wetland Delineation* (Wildlands 2005).

### **3.2.1 Annual Grasslands**

Annual grassland is an upland plant community (habitat) dominated by nonnative grasses, but containing a diverse assemblage of native and nonnative forbs. Nonnative annual grasses and weedy annual and perennial forbs dominate this habitat type. Vegetation in the annual grassland is dominated by species that are rarely found in wetlands.

A majority of the Proposed Action occurs in annual grasslands. Most of the annual grasslands affected by the Proposed Action are previously disturbed and dominated by ruderal vegetation. The lower species diversity common in ruderal habitat generally provides less value to wildlife than the higher species diversity found in native annual grassland habitat. Scattered native wildflower species that represent remnants of the original vegetation are also present in less-disturbed sites.

Annual grasslands at Beale AFB provide foraging habitat and cover to numerous locally and regionally common wildlife species. The majority of annual grasslands that would be affected by the Proposed Action have been subject to disturbances from human activity. Wildlife values of these areas are considered low.



### 3.2.2 Wetland Resources

Vernal pools on Beale AFB are classified as Northern Hardpan Vernal Pools (Sawyer and Keeler-Wolf 1995). Northern Hardpan Vernal Pools are an aggregate vegetation community that includes vernal pools, vernal swale wetlands, and depressional seasonal wetlands. Vernal pools are small, shallow, seasonal bodies of water formed by precipitation accumulating in depressions over an impervious claypan or bedrock bottom. They provide unique habitat for plants that germinate as aquatic or semiaquatic plants but that must adapt to terrestrial life and a dryland environment as the pool dries.

The dominant species in typical vernal pools at Beale AFB are coyote thistle (*Eryngium yaseyi*), Fremont goldfields (*Lasthenia fremontii*), white-flowered navarretia (*Navarretia leucocephala*), annual hairgrass (*Deschampsia danthonioides*), field owl's-clover (*Castilleja campestris*), and ornate downingia (*Downingia ornatissima*). Vegetation in vernal pools is dominated by species that are usually found in wetlands.

Disturbed seasonal wetlands are wet areas that have been degraded by human or livestock activities, such as clearing, grading, trampling, or grazing. The disturbed seasonal wetlands in the study area are not natural features, but were formed by grading activities that created depressions. Because these are recently formed features, the vegetation is similar to that of vernal pools. However, the diversity and cover of vernal pool species is lower than in vernal pools, and the cover of nonnative disturbance-tolerant species is higher.

Seasonal wetlands, including vernal pools, at Beale AFB provide important foraging and breeding habitat and cover for wetland wildlife and invertebrates. The high densities of terrestrial and aquatic invertebrates (e.g., ostracods, copepods, flatworms, and mosquito larvae) in wetland habitats provide an abundance of food for wildlife. Many wildlife species, including killdeer (*Charadrius vociferous*) and Pacific treefrogs (*Pseudacris regilla*), feed on the aquatic invertebrates found in seasonal wetlands. Many other wildlife species feed in or adjacent to wetlands; these species include western kingbirds (*Tyrannus verticalis*), cliff swallows (*Hirundo pyrrhonota*), barn swallows (*H. rustica*), red-winged blackbirds (*Agelaius phoeniceus*), and common kingsnakes (*Lampropertis getulus*) (BAFB 1999). Wetlands provide potential habitat for several special-status species listed in Section 3.2.3.

Other seasonal wetlands occur in topographic low areas or depressions. While they might be associated with riverine systems (either tributary to or interspersed within riverine features), at some point or points during the rainy season their hydrology is dominated by still water.

Vernal pools, disturbed seasonal wetlands, and other seasonal wetlands occur within the Proposed Action impact area. Vernal pools, disturbed seasonal wetlands, and other seasonal wetlands occurring on Beale AFB are found predominantly in the western, central, and southern portions of the base. Portions of the Construct Heritage Park, Install Global Hawk LRE Cables, Vernal Pool Restoration Phase 2, Construct Visitor Center Main Gate, and P2 Rock Crusher projects would be in the vicinity of vernal pools, disturbed seasonal wetlands, and other seasonal wetlands.

### 3.2.3 Special-Status Species

#### Vegetation

There are four plant species formally protected under Federal or state law that are found in Yuba County: Hartweg's golden sunburst (*Pseudobahia bahiifolia*), hairy Orcutt grass (*Orcuttia pilosa*), Hoover's spurge (*Chamaesyce hooveri*), and slender Orcutt grass (*Orcuttia tenuis*). None of these have been observed on Beale AFB. A fifth species, Greene's tuctoria (*Tuctoria greene*), is proposed for Federal listing but has not been observed on Beale AFB.

#### Animals

There are 13 animal species formally protected under Federal or state law that are found in Yuba County. Four of those species occur in the vicinity of the Proposed Action.

- The federally protected vernal pool fairy shrimp (*Branchinecta lynchi*) and vernal pool tadpole shrimp (*Lepidurus packardii*) habitat occurs within the Construct Heritage Park and Construct Visitor Center Main Gate.
- The federally protected valley elderberry longhorn beetle (VELB) (*Desmocerus californicus dimorphus*) habitat occurs in the vicinity of upgrade JP-8 hydrant pits and lids project.
- The federally protected giant garter snake (*Thamnophis gigas*) habitat occurs adjacent to the Vernal Pool Restoration Phase 2/Site 1 project.
- The federally protected bald eagle (*Haliaeetus leucocephalus*) is an irregular migrant to the area, and cannot be considered to be using the base for more than occasional foraging.
- The state-protected white-tailed kite (*Elanus leucurus*), present on the base year-round, cannot be considered to use the project site for more than occasional foraging.
- The state-protected golden eagle (*Aquila chrysaetos*), a year-round visitor to the base, cannot be considered to use the project site for more than occasional foraging.
- The state-protected American peregrine falcon (*Falco peregrinus anatum*), an irregular visitor to the base, cannot be considered to use the project site for more than occasional foraging.

- The state-protected black rail (*Laterallus jamaicensis*) has not been observed on the project site.
- The state-protected Swainson's hawk (*Buteo swainsoni*) and greater sandhill crane (*Grus canadensis tabida*) have not been observed on the project site.
- The federally protected Central Valley steelhead (*Oncorhynchus mykiss*) and Chinook salmon (*Oncorhynchus tshawytscha*) have not been observed on the project site as there are no waterways within the project boundaries.
- In addition, many bird species present on the project site (including those identified above) are subject to regulation under the Migratory Bird Treaty Act.

### 3.3 Water Resources

Water resources include surface water, groundwater, and floodplains. This evaluation identifies the quantity and quality of the resource and its demand for potable, irrigation, and industrial purposes. Surface water resources consist of lakes, rivers, and streams. Surface water is important for its contributions to the economic, ecological, recreational, and human health of a community or locale. Groundwater typically can be described in terms of its depth from the surface, aquifer or well capacity, water quality, surrounding geologic composition, and recharge rate. Floodplains are areas of low-level ground present along a river or stream channel. Federal, state, and local regulations often limit floodplain development to passive uses such as recreation and preservation activities to reduce the risks to human health and safety.

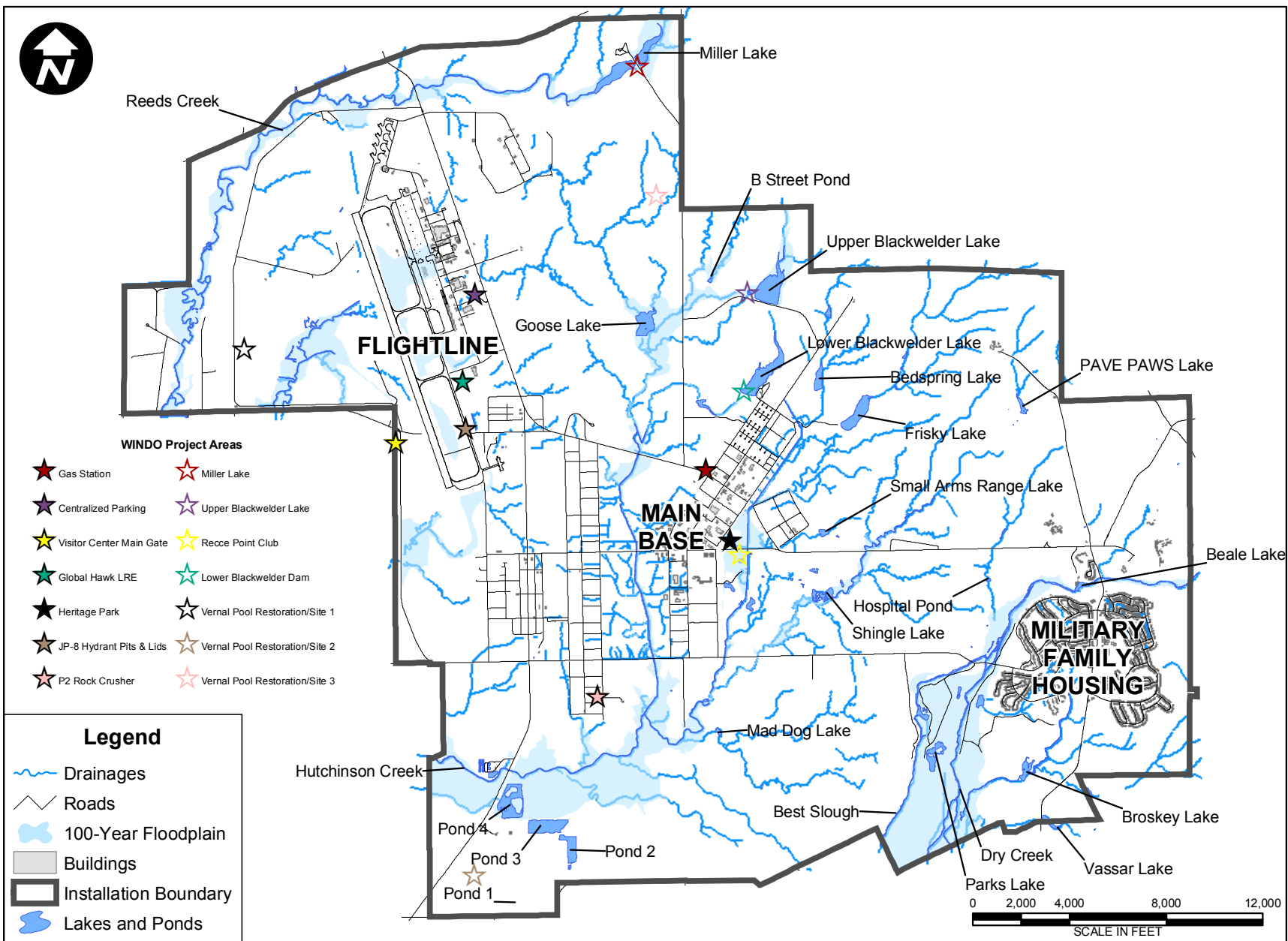
#### Surface Water

Several lakes and small impoundments are located on Beale AFB, and three major drainage channels (Dry, Hutchinson, and Reeds creeks) cross the base in a generally northeast-to-southwest direction. Dry, Reeds, and Hutchinson creeks are not within the project area; however, many drainages are within or adjacent to the project areas (Figure 3-2).

#### Jurisdictional Waters of the U.S.

Those areas that convey water, exhibit an "ordinary high water mark," and do not meet the three-parameter criteria for wetlands might be nonwetland waters of the U.S. An ordinary high water mark is defined as the line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation, or the presence of litter and debris (33 CFR 328.3). This range of jurisdiction is typically regarded as the limit of the 2-year storm (a 50 percent probability that the line will be reached during the rainy season) (Foothill 2004).

Figure 3-2. Major Surface Waters and 100-Year Floodplain on Beale AFB



The USACE recognizes three distinct types of drainage features: ephemeral drainages, intermittent drainages, and perennial drainages. Ephemeral drainages are fed primarily by storm water. They convey flows during and immediately after storm events, but they might stop flowing or begin to dry if the interval between storms is long enough. Intermittent drainages are fed primarily by groundwater and supplemented by storm water. After the onset of rains they should have persistent flows through and past the end of the rainy season. Eventually, depending on the availability of groundwater, these features become dry. Perennial drainages are fed predominantly by groundwater and supplemented by storm water. Flows in these systems persist throughout the year (Foothill 2004).

Jurisdictional waters of the U.S. that could be impacted by the Proposed Action are in portions of the Construct Heritage Park, Install Global Hawk LRE Cables, Vernal Pool Restoration Phase 2, Construct Visitor Center Main Gate, Erosion Control at Upper Blackwelder Lake, Erosion Control at Miller Lake, and Erosion Control at Lower Blackwelder Lake projects.

## **Groundwater**

Yuba County lies over the north-central portion of the Central Valley groundwater basin, which is an extensive aquifer extending approximately 400 miles from Red Bluff to Bakersfield and averaging 40 miles wide. This aquifer is a complex system of different groundwater basins composed of stratified sand, silt, and clay layers many thousands of feet thick. Groundwater at Beale AFB is found 300 to 500 feet below ground surface and is presumed to originate in unconfined aquifer materials with local clay/silt lenses overlying the Central Valley groundwater basin. Groundwater in the northern portion of the base receives recharge from the Yuba River drainage basin and generally has the highest quality at the base, with low levels of total dissolved solids, nitrates, and sulfates; groundwater in the central portion of the base has higher levels of total dissolved solids; and groundwater at the south end of the base receives recharge from Dry Creek and Bear River and has quality between that of the north and central regions.

Water for domestic use at Beale AFB is provided from nine wells on the base. Total water use at the base varies from 2.5 to 6.0 million gallons per day. The wells have a total combined pumping capacity of 5.0 million gallons per day. Water quality meets primary drinking standards, but not secondary water quality standards for iron and manganese, for which the only treatment is chlorination and fluoridation (BAFB 1999).

## **Floodplains**

Creeks at Beale AFB are surrounded by wide floodplain areas created by the occasional heavy rainfall that occurs in the region, impervious soil conditions, and lack of topographic relief. The location of the

100-year floodplain at Beale AFB is shown in Figure 3-2. Various areas along major drainages at Beale AFB (Dry, Reeds, and Hutchinson creeks; and Best Slough) are within the 100-year floodplain. These floodplains flood periodically to varying degrees. Portions of the flightline, cantonment, military family housing, and riparian areas are within these floodplains (BAFB 1999). The Construct Heritage Park, Upgrade JP-8 Hydrant Pits And Lids, Vernal Pool Restoration Phase 2 (Sites 1, 2, and 3), Erosion Control at Miller Lake, Erosion Control at Upper Blackwelder Lake, Erosion Control at Lower Blackwelder Lake, and Repair Force Protection at Recce Point Club project sites are within the 100-year floodplain.

### 3.4 Cultural Resources

Cultural resources consist of prehistoric and historic artifactual material, archaeological sites, districts, structures, or any other physical evidence of previous human activities that are part of the current landscape. The three primary categories of cultural resources that are addressed by Federal regulations regarding the protection and preservation of cultural resources on Federal property are (1) archaeological sites (typically subsurface deposits), (2) architectural resources (standing structures and buildings), and (3) Traditional Cultural Properties (TCPs) (landscapes determined to be important to a particular culture or group). For undertakings on Federal property, the assessment of impacts on cultural resources in association with the EA process is conducted according to the regulations contained in the National Historic Preservation Act of 1966 (NHPA); 36 CFR Part 800, *Protection of Historic and Cultural Properties*; Archaeological Resources Protection Act of 1979 (ARPA); Executive Order (EO) 13007, *Indian Sacred Sites*; and EO 13084, *Consultation and Coordination with Indian Tribal Governments*.

As part of the EA process, NHPA requires an assessment of potential impacts on cultural resources and the potential for adverse effects on historic properties associated with proposed undertakings located on Federal property or to be completed with Federal funds. Historic properties are cultural resources that have been evaluated and determined to be eligible for listing on the National Register of Historic Places (NRHP). Eligibility for nomination to the NRHP is determined by a cultural resource's ability to satisfy the eligibility criteria described in Section 106 of the NHPA, as defined in 36 CFR Part 800 and National Register Bulletin 15. Cultural resources that have not been evaluated for NHRP eligibility are considered eligible for compliance purposes until such evaluation has been completed and a formal determination of eligibility is made. In accordance with EO 12372, *Intergovernmental Review of Federal Programs*, and the requirements of the Beale AFB Cultural Resources Management Plan (CRMP) (BAFB 1998), Section 106 consultation would be initiated with the State Historic Preservation Officer (SHPO) if the Proposed Action were determined to represent potential adverse effects to cultural resources. Cultural resources management activities involving subsurface archaeological excavation (site testing or data



recovery) at potentially eligible archaeological sites would not be implemented without SHPO concurrence.

Approximately 84 percent of the base has been systematically surveyed for cultural resources during the course of 22 archaeological investigations and 2 historic architectural investigations conducted at the installation (BAFB 1998). Portions of the installation that remain unsurveyed are limited to heavily disturbed areas associated with the flightline, cantonment, and military family housing areas in the interior of the base. These areas have been defined by Beale AFB as “archaeologically free zones” based on ethnographic, topographic, and geologic characteristics indicating that these areas have a low potential for intact archaeological deposits (BAFB 1998).

For the purpose of determining potential impacts to cultural resources, the Area of Potential Effects (APE) for the Proposed Action is defined as being confined to the identified work areas within the boundaries of each of the 12 individual projects. The APE for the Proposed Action has been previously surveyed for cultural resources, and all cultural resources with a visible surface component have been located and identified (BAFB 1998). However, deeply buried or masked (heavily vegetated) archaeological resources that were not identified or recorded during the course of previously conducted surveys might exist within the APE. Portions of the Proposed Action would be within geoarchaeologically sensitive areas, as defined by the presence of Perkins and/or Conejo loams typically associated with deeply buried archaeological deposits in the region (BAFB 1998). However, an analysis of the results of previous archaeological studies conducted at the base regarding archaeological site density and distribution patterns indicates that the overall geoarchaeological sensitivity of the APE is relatively low. No TCPs, cemeteries, or isolated human burials have been identified within the boundaries of the Proposed Action.

An archaeological site record search was conducted for previously recorded sites within each of the 12 projects associated with the Proposed Action, including a buffer zone of 200 feet outside of the boundary of each project. The results of the site record search indicate that there are a total of 17 previously recorded cultural resources in this area. Fourteen of these archaeological sites are outside the boundary of the Proposed Action, but within the 200 foot buffer zone adjacent to the Proposed Action (Table 3-2).

**Table 3-2. Archaeological Sites Adjacent to the Proposed Action**

<b>Project</b>	<b>Site No.</b>	<b>Site Type</b>	<b>Temporal Association – Era</b>
Upgrade JP-8 Hydrant Pits and Lids	AH-36	Building Remains	Historic – Military
	AH-38	Building Remains	Historic - Pre-Military
	AH-69	Building Remains	Historic – Military
	PL-33	Building Remains	Historic – Pre-Military
Vernal Pool Restoration (Phase 2/Site 1)	AH-4	Ranch/Homestead	Historic – Pre-Military
	AH-6	Debris Scatter	Historic – Pre-Military
	AH-72	Concrete Bridge Remains	Historic – Pre-Military
	PL-29	Ranch/Homestead	Historic – Pre-Military
Vernal Pool Restoration (Phase 2/Site 3)	AH-10	Milling Features and Lithic Scatter	Prehistoric – Unknown
	BAF-4	Concrete Bridge	Historic – Pre-Military
	BAF-5	Concrete Bridge	Historic – Pre-Military
	PL-24	Ranch/Homestead	Historic – Pre-Military
Erosion Control at Miller Lake	AH-48	Foundation Remains and Debris Scatter	Historic – Pre-Military
Erosion Control at Lower Blackwelder Lake	AH-19	Foundation Remains	Historic – Military

Previously recorded cultural resources within the buffer zone, but outside of the boundaries of the Proposed Action include 14 archaeological sites (Table 3-2). Based on a review of the original site records, it appears that the boundaries of these 14 archaeological sites are reliably defined and documented. Since ground disturbance would not occur outside the boundaries of the Proposed Action, there is no potential for impacts to these 14 archaeological sites associated with the Proposed Action. Therefore, these 14 archaeological sites are not addressed further in this EA.

Previously recorded cultural resources within the boundaries of the Proposed Action include three archaeological sites that are within the boundaries of three of the 12 proposed projects. These three

archaeological sites are temporally associated with the historic pre-military or military eras at the installation, as defined in the Beale AFB CRMP (BAFB 1998) (Table 3-3).

**Table 3-3. Archaeological Sites Within the Boundary of the Proposed Action**

<b>Project</b>	<b>Site Number</b>	<b>NRHP Status (BAFB 1998)</b>	<b>Site Type</b>	<b>Temporal Association – Era</b>
Upgrade JP-8 Hydrant Pits and Lids	AH-56	Not Eligible	WAC Housing Area	Historic – Military
Vernal Pool Restoration Phase 2/Site 3	AH-63	Potentially Eligible	Ranch/Homestead	Historic – Pre-Military
P2 Rock Crusher	AH-29	Not Eligible	World War II German Prisoner of War Camp	Historic – Military

Source: BAFB 1998

### 3.5 Geological Resources

An area's geological resources typically consist of surface and subsurface materials and their inherent properties. Soil depth, structure, elasticity, strength, shrink-swell potential, and erodibility determine a soil's ability to support man-made structures and facilities. Soils typically are described in terms of their series or association, slope, physical characteristics, and relative compatibility or constraints with respect to particular construction activities and types of land use.

The base is on the boundary between the Great Valley and Sierra Nevada Geologic Provinces and contains characteristics of both (BAFB 1999). A majority of Beale AFB has the geologic characteristics of river floodplains and channels of the Modesto Formation, low alluvial plains and fans of the riverbank formation, and dissected uplands of the Mehrten and Laguna Formations. The remainder of the base consists of metavolcanic rock characteristic of the Sierra Nevada foothills.

There are 10 soil series found on Beale AFB. These were grouped by the Natural Resources Conservation Service (NRCS) according to their topographic position and drainage characteristics. These soil types are Auburn loam, Argonaut-Auburn loams, Auburn-Sobrante loams, Auburn-Sobrante-rock outcrop complex, Conejo loam, Pardee gravelly loam, Pardee-Rancho Seco complex, Perkins loam, Redding-Corning complex, and San Joaquin loam (BAFB 2001b). Soil series associated with each of the 12 projects are described in Table 3-4.

**Table 3-4. Soil Series Associated with the Proposed Action**

<b>Project</b>	<b>Soil Series</b>
Construct Heritage Park	Perkins loam and Redding-Corning complex
Install Global Hawk LRE Cables and Construct Flightline Centralized Parking South Access Road	Redding-Corning complex
Upgrade JP-8 Hydrant Pits and Lids and Construct Gas Service Station, Auto Hobby Shop, and Car Wash	San Joaquin loam and Redding-Corning complex
Vernal Pool Restoration Phase 2 (Sites 1 and 2 and inoculum collection near Main Gate) and P2 Rock Crusher	Perkins loam and San Joaquin loam
Vernal Pool Restoration Phase 2/Site 3	San Joaquin loam, Pardee gravelly loam, and Pardee-Rancho Seco complex
Construct Visitor Center Main Gate	San Joaquin loam
Erosion Control at Upper Blackwelder Lake	Pardee gravelly loam and Pardee-Rancho Seco complex
Erosion Control at Miller Lake	Perkins loam, Pardee gravelly loam, and Pardee-Rancho Seco complex
Erosion Control at Lower Blackwelder Lake	Redding-Corning complex, Perkins loam, and Argonaut-Auburn loam
Repair Force Protection at Recce Point Club	Perkins loam

Source: BAFB 2001b

### 3.6 Hazardous Materials and Waste Management

Hazardous substances are defined by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) as any substance with physical properties of ignitability, corrosivity, reactivity, or toxicity that can cause an increase in mortality, a serious irreversible illness, or an incapacitating reversible illness; or pose a substantial threat to human health or the environment. Hazardous waste is defined by the Resource Conservation and Recovery Act (RCRA) as any solid, liquid, contained gaseous, or semisolid waste, or any combination of wastes that poses a substantial present or potential hazard to human health or the environment. The Department of Defense has also developed the Environmental Restoration Program (ERP) to facilitate thorough investigation and cleanup of contaminated sites on military installations. The ERP is designed to identify, confirm, and clean up problems arising from past releases of hazardous substances and petroleum products into the environment.

## **Hazardous Materials and Waste**

The 9 CES/CEV is responsible for the hazardous material and waste plans for the installation. In conformance with the policies established by Air Force Policy Directive 32-70, 9 CES/CEV has developed plans to manage hazardous materials, hazardous wastes, and special hazards on the base. Base and contractor personnel collect hazardous wastes at initial accumulation points. From the initial accumulation points, wastes are taken to the Centralized Accumulation Site on the base and shipped to off-base disposal facilities. In accordance with the Beale AFB Hazardous Waste Management Program, hazardous wastes are stored on base for a maximum of 75 days.

### **Asbestos-Containing Material (ACM) and Lead-Based Paint (LBP)**

A survey of buildings at Beale AFB was performed to locate, identify, and evaluate any materials containing asbestos. Materials that might contain asbestos include thermal-system insulation and floor tiles. ACM is removed on an as-needed basis to minimize health risks from release of asbestos fibers during normal activities, maintenance, renovation, or demolition. Components of the foundations, walls, and debris piles in the P2 Rock Crusher project area might have ACM.

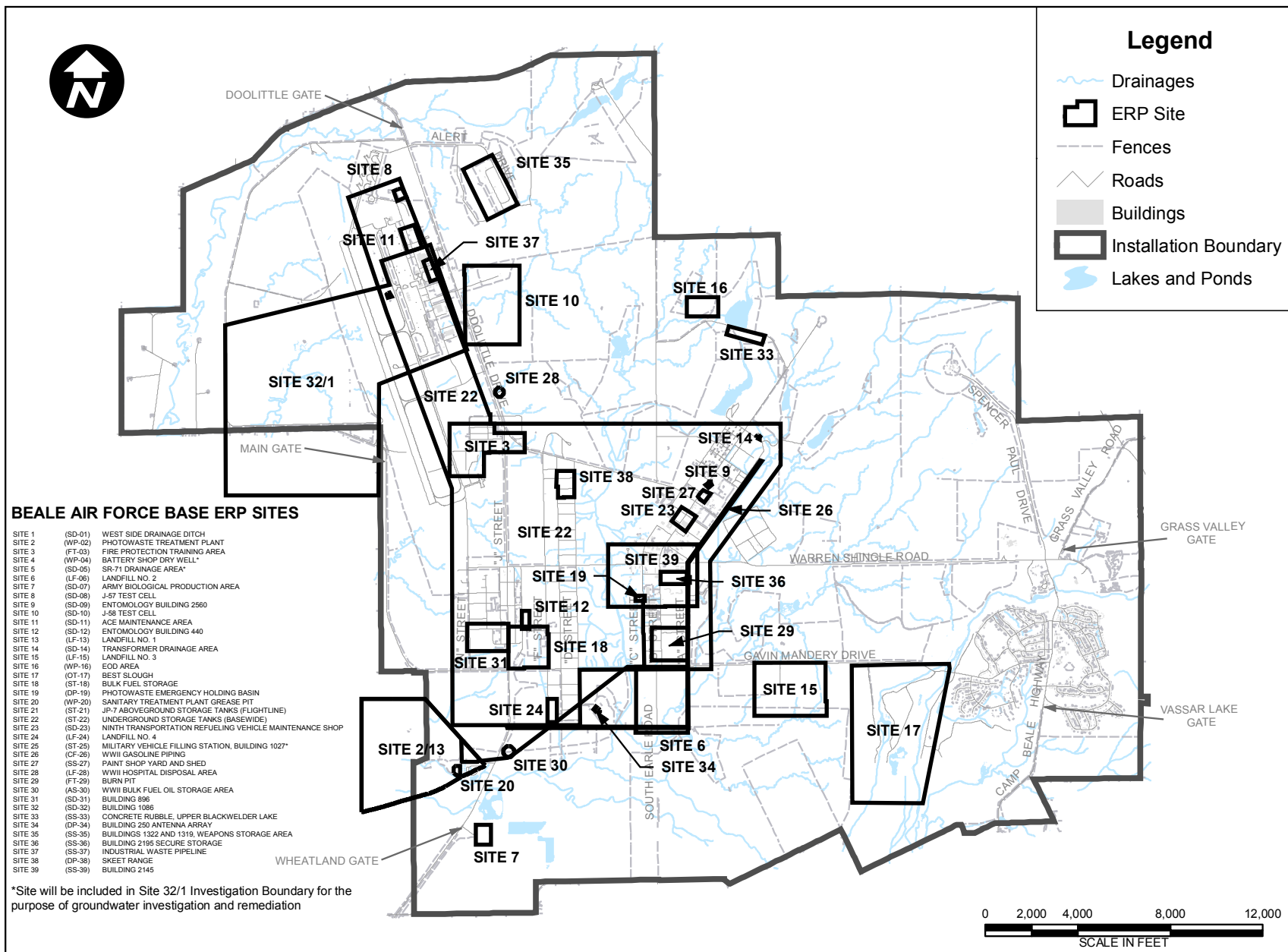
Beale AFB has conducted a survey of buildings for the presence of LBP. The survey mainly focused on child-occupied facilities. The results of the survey are maintained in an LBP database at Civil Engineering. Components of the foundations, walls, and debris piles in the P2 Rock Crusher project area might contain LBP.

## **ERP**

The ERP at Beale AFB began in 1984 with a basewide records search that identified 16 ERP sites for further investigation (see Figure 3-3). Primary contaminants in soil and water include fuels, oils, pesticides, herbicides, waste solvents, and inorganic compounds. Progress under ERP is closely coordinated with various regulatory agencies, including the Cal-EPA Department of Toxic Substance Control and the California Regional Water Quality Control Board (CRWQCB).

Five ERP sites (SD-01, West Side Drainage Ditch; SD-07, Army Biological Production Area; WP-16, Explosive Ordnance Disposal Area; ST-22, Basewide Underground Storage Tanks [USTs]; and SD-32, Building 1086) and two Areas of Concern (AOCs) (AOC 34, JP-7 Pipeline Leak and AOC 66, East Main Drainage Disposal Area) are in the vicinity of the Proposed Action (ACC 2003). These seven sites are described below in more detail.

Figure 3-3. ERP Site Location Map for Beale AFB





- **ERP Site SD-01.** This site consists of a West Side Drainage Ditch that drains runoff from the flightline surface areas, and encompasses approximately 1,345 acres. Three 66-inch-diameter pipes discharge runoff through a headwall approximately 800 feet west of the runway. Past surface water quality analyses indicated that oil and grease, and trans-1, 2-dichloroethylene (trans-1, 2-DCE) were contained in water discharged to the west side drainage ditch.
- **ERP Site SD-07.** From 1962 to 1969, the U.S. Army used the area adjacent to the base pheasant farm as a wheatstem rust (fungal disease) biological production test site. Chemicals associated with the wheatstem rust program included Freon, carbon dioxide, ethylene oxide, and possibly trichloroethylene (TCE). At the end of the project, remaining wheat stocks were removed, chemically treated, and incinerated. Carboxide treatment was used to destroy the rust fungus stocks. Residual incinerator ash was spread on site grounds and plowed to a depth of 6 inches. Site SD-07 was part of the base's RCRA Part B Permit. Surface soils at the site show no contamination above background levels except for silver. This site was cleaned and closed in 2000. A no further response declaration was signed and approved by the California Department of Toxic Substances Control and CRWQCB. Therefore, this site will not be discussed further in this EA.
- **ERP Site WP-16.** This site is part of the base's RCRA Part B Permit. Munitions, explosives, flares, and pyrotechnics (unused ordnance) from military bases in central California were detonated in bunkers or open fields at this site. In addition, diesel fuel and wood were used as combustion sources for burning small ordnance.
- **ERP Site ST-22.** This site consists of USTs currently or formerly located at Beale AFB and is part of the base's RCRA Part B permit. This site contained approximately 1,089 fuel oil and gasoline USTs ranging in size from 150 to 12,000 gallons. Contaminated soil was identified and removed from this site. Soil vapor extraction and bioventing systems were installed within this site for treatment of residual petroleum hydrocarbons in the soil. Currently, 66 USTs remain open and are scheduled for closure.
- **ERP Site SD-32.** This site was used for B-52 equipment maintenance and associated with the Titan Missile Program. Historic operations associated with Building 1086 included the use of USTs, wash racks, oil/water separator, degreasing room, and industrial waste line. This site is a suspected source of halogenated volatile organic compounds (VOCs). Cleanup and abatement of this site requires periodic sampling of soil and groundwater via base monitoring and soil vapor extraction wells.
- **AOC 34.** An 8-inch-diameter aluminum pipeline used to transport JP-7 jet fuel from the Beale AFB bulk fuel storage area to the flightline is present on the eastern side of the flightline area.

Near Taxiway 8, the fuel supply line branches east toward the SR-71 Engine Test Facility (ERP Site SD-10). A rupture of this pipeline occurred approximately halfway between Taxiway 8 and Doolittle Drive in February 1985; the quantity of product released is not known. AOC 34 includes the rupture site and the surrounding areas. Contaminated soil at this site has been removed and this site is now closed. Therefore, this site will not be discussed further in this EA.

- **AOC 66.** This AOC consists of three distinct rubble disposal sites identified during a review of 1943 aerial photographs near the intersection of Warren Shingle Road and the East Main Drainage Ditch. One disposal site is in an unimproved, open field north of Warren Shingle Road; a small piece of concrete and metal debris is visible on the ground surface in this area. The other two disposal sites are in an area currently occupied by the Beale AFB golf course, club house, and driving range; no visual evidence of past disposal remains in these areas. The new Tri-Club recreational facility is being constructed within the boundaries of AOC 66. Field efforts at AOC 66 consisted of a geophysical survey, a soil vapor survey, and hand auger sampling. No anomalies or constituents of concern were identified at AOC 66. Based on these results, AOC 66 is considered closed as an area of no suspected contamination. Therefore, this site will not be discussed further in this EA.

### **3.7 Safety and Military Munitions Response Program (MMRP)**

#### **Safety**

A safe environment is one in which the potential for death, serious bodily injury or illness, or property damage is eliminated or reduced as much as possible. Human health and safety addresses workers' health and safety during demolition and construction activities, and public safety during demolition and construction activities and subsequent operations of those facilities.

All contractors performing construction activities at Beale AFB are responsible for following ground safety regulations and worker compensation programs and are required to conduct construction activities in a manner that does not pose any risk to workers or base personnel. An industrial hygiene program addresses exposure to hazardous materials, use of personal protective equipment, and availability of Material Safety Data Sheets. Industrial hygiene is a responsibility of contractors.

Beale AFB has several activities that require Explosive Quantity Distance (EQD) Safety Zones. These zones are established to minimize risk and exposure to individuals from explosives and explosive storage

facilities. The General Plan shows numerous EQD Safety Zones on the northern and southern parts of the base (BAFB 2000).

## **MMRP**

The MMRP was established in 2001 to manage the environmental, health and safety issues presented by unexploded ordnance (UXO), discarded military munitions (DMM) and munitions constituents (MC). The MMRP is an element of the Defense Environmental Restoration Program (DERP), under which the Secretary of Defense carries out environmental restoration resulting from historical activities.

The land encompassing Beale AFB was originally part of Camp Beale. Camp Beale was established in 1942 and consisted of approximately 62,000 acres in Yuba and Nevada counties. Between 1942 and 1964, large portions of Camp Beale were leased, transferred, or sold to other parties. Between 1942 and 1964, the U.S. Army conducted various munitions tests throughout Camp Beale (USACE 2001). Since 1964, the USAF has also conducted munitions tests on Beale AFB. In 2001, the USACE conducted an archives search report to determine the historic land uses, range locations, and types of munitions that might have been used on Camp Beale.

Range sites discovered on Beale AFB may contain various munitions, UXO, and Chemical Agent Identification Sets (CAIS). Most of the munitions, UXO, and CAIS on the surface of Camp Beale have been removed. However, munitions, UXO, and CAIS still can be found below the ground surface. The Install Global Hawk LRE Cables, Upgrade JP-8 Hydrant Pits and Lids, Vernal Pool Restoration Phase 2/Site 3, Construct Flightline Centralized Parking South Access Road, Erosion Control at Miller Lake, and Erosion Control at Lower Blackwelder Lake projects are within known active and historic range sites. Although the other WINDO projects are not within range sites, munitions, UXO, and CAIS could still be encountered within these project areas.

The need for munitions, UXO, and CAIS screening at potential UXO sites would be determined on a case-by-case basis. Any projects within potential UXO sites would obtain an environmental restoration waiver from Headquarters ACC/Environmental Flight (HQ ACC/CEVR) prior to commencement of construction activities. 9 CES/CEV staff would be contacted prior to commencement of construction activities to determine if an ERP waiver is required for the Proposed Action for all proposed work on or near range sites and for safety requirements that would need to be followed during construction.

### 3.8 Transportation

Regional access to Beale AFB is provided by State Route (SR) 65, SR 70, and SR 20. SR 65 is a north-south roadway extending from Interstate 80 in Roseville to SR 70 approximately 7 miles south of Marysville. Five main roads provide access to the base. North Beale Road extends from SR 70 in Linda to the Main Gate and is the primary road connecting the installation and SR 70, Marysville, and Yuba City. Hammonton-Smartville Road is a two-lane rural roadway providing access from North Beale Road in Linda to SR 20 near Smartville. This roadway provides access to the base at the Doolittle Gate. Smartville Road is a two-lane rural roadway providing access from the Grass Valley Gate to Hammonton-Smartville Road south of SR 20. South Beale Road is a two-lane roadway providing access from SR 65 northwest of Wheatland to the Wheatland Gate. Spenceville Road is a two-lane rural roadway connecting SR 65 at the City of Wheatland to the Vassar Lake Gate. The road network on Beale AFB consists of arterials, collectors, and local streets. Arterials, those streets that carry the majority of the traffic, are

- Gavin Mandery Drive (Main Gate to Camp Beale Highway)
- Doolittle Drive (Doolittle Gate to Warren Shingle Road)
- Grass Valley Road/Warren Shingle Road (Grass Valley Gate to J Street)
- Camp Beale Highway (Vassar Lake Gate to Warren Shingle Road)
- J Street (Wheatland Gate to Doolittle Drive)

***THIS PAGE INTENTIONALLY LEFT BLANK***



## 4.0 Environmental Consequences

---

This section of the EA analyzes direct and indirect effects on the environment associated with the scope of the Proposed Action as described in Section 2.0 and in consideration of the potentially affected environment as characterized in Section 3.0. Direct effects are caused by the action and occur at the same time and place. Indirect effects are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable.

### 4.1 Air Quality

The potential impacts on local and regional air quality conditions near a proposed Federal action are determined based on the increases in regulated pollutant emissions relative to existing conditions and ambient air quality. Specifically, the impact in NAAQS attainment areas would be considered significant if the net increases in pollutant emissions from the Federal action resulted in one of the following scenarios:

- Cause or contribute to a violation of any national or state ambient air quality standard
- Expose sensitive receptors to substantially increased pollutant concentrations
- Represent an increase of 10 percent or more in an affected AQCR emissions inventory

Impacts on air quality in NAAQS nonattainment areas are considered significant if the net changes in project-related pollutant emissions result in one of the following scenarios:

- Cause or contribute to a violation of any national or state ambient air quality standard
- Increase the frequency or severity of a violation of any ambient air quality standard
- Exceed any significance criteria established in a SIP
- Delay the attainment of any standard or other milestone contained in the SIP

With respect to the General Conformity Rule, impacts on air quality would be considered significant if the Proposed Action resulted in an increase of a nonattainment or maintenance area's emissions inventory by 10 percent or more for one or more nonattainment pollutants, or if such emissions exceeded *de minimis* threshold levels established in 40 CFR 93.153(b) for individual nonattainment pollutants or for pollutants for which the area has been designated as a nonattainment or maintenance area. The *de minimis* threshold levels are presented in Table 4-1. As shown in Table 4-1, *de minimis* thresholds vary depending upon the severity of the nonattainment area classification.

**Table 4-1. Conformity *de minimis* Emissions Thresholds**

<b>Pollutant</b>	<b>Status</b>	<b>Classification</b>	<b><i>de minimis</i> Limit (tpy)</b>
O <sub>3</sub> (measured as NO <sub>x</sub> or VOCs)	Nonattainment	Extreme	10
		Severe	25
		Serious	50
		Moderate/marginal (inside ozone transport region)	50 (VOCs)/100 (NO <sub>x</sub> )
		All others	100
	Maintenance	Inside ozone transport region	50 (VOCs)/100 (NO <sub>x</sub> )
		Outside ozone transport region	100
CO	Nonattainment/ maintenance	All	100
PM <sub>10</sub>	Nonattainment/ maintenance	Serious	70
		Moderate	100
		Not Applicable	100
SO <sub>2</sub>	Nonattainment/ maintenance	Not Applicable	100
NO <sub>x</sub>	Nonattainment/ maintenance	Not Applicable	100

Source: 40 CFR 93.153

Notes:

tpy – tons per year

NO<sub>x</sub> – nitrogen oxides

VOC – volatile organic compound

Since a USEPA-designated nonattainment area would be affected by this Proposed Action, the USAF must comply with the Federal General Conformity Rule (40 CFR Part 93). To do so, an analysis has been completed to ensure that, given the changes in direct and indirect emissions of the O<sub>3</sub> precursors (nitrogen oxides [NO<sub>x</sub>] and VOCs), PM<sub>10</sub>, and CO, the Proposed Action would be in conformity with applicable CAA requirements. The full Conformity Determination requirements specified in this rule can be avoided if the project-related nonattainment pollutant emissions rate increases are below *de minimis* threshold levels for each pollutant and are not considered regionally significant. For purposes of determining conformity in this nonattainment area, projected regulated pollutant emissions associated with the Proposed Action were estimated using available construction emissions and other nonpermitted emissions source information. The emissions calculations and *de minimis* threshold comparisons are collectively presented in the CAA General Conformity emissions calculations provided in Appendix B.

#### 4.1.1 Proposed Action

Construction projects would generate total suspended particulate and PM<sub>10</sub> emissions as fugitive dust from ground-disturbing activities (e.g., grading, demolition, soil piles) and combustion of fuels in construction equipment. Fugitive dust emissions would be greatest during the initial site preparation activities and would vary from day to day depending on the construction phase, level of activity, and prevailing weather conditions. The quantity of uncontrolled fugitive dust emissions from a construction site is proportional to the area of land being worked and the level of construction activity.

For purposes of this analysis, information presented in Section 2 was used to estimate fugitive dust and all other criteria pollutant emissions. The construction emissions presented in Table 4-2 include the estimated annual construction PM<sub>10</sub> emissions associated with the Proposed Action at Beale AFB. These emissions would produce slightly elevated short-term PM<sub>10</sub> ambient air concentrations. However, the direct effects would be temporary and would fall off rapidly with distance from the proposed construction site.

Construction operations would also result in emissions of criteria pollutants as combustion products from construction equipment as well as evaporative emissions from architectural coatings and asphalt paving operations, which are also presented in Table 4-2. Specific information describing the types of construction equipment required for a specific task, the hours the equipment is operated, and the operating conditions vary widely from project to project. For purposes of analysis, these parameters were estimated using established methodologies for construction and experience with similar types of construction projects. These emissions would be of a temporary nature. The emissions factors and estimates were generated based on guidance provided in *Guide to Air Quality Assessment* from the Sacramento Metropolitan Air Quality Management District (SMAQMD 2004).

**Table 4-2. Annual Construction Emissions Estimates from the Proposed Action at Beale AFB, CA**

Calendar Year	NO <sub>x</sub> <sup>a</sup> (tpy)	VOC <sup>a</sup> (tpy)	CO (tpy)	SO <sub>2</sub> (tpy)	PM <sub>10</sub> <sup>a</sup> (tpy)
2005	7.13	1.12	8.28	0.21	25.15
2006	5.12	0.89	6.43	0.13	40.63
2007	2.02	0.34	2.91	0.04	13.87

Notes:

<sup>a</sup> Denotes nonattainment pollutant in FRAQMD of the USEPA Region 9 Sacramento Valley Intrastate AQCR.

tpy – tons per year

As mentioned earlier, FRAQMD is classified as being in *moderate* transitional nonattainment for O<sub>3</sub>, a nonattainment area for PM<sub>10</sub>, and is in attainment for all other criteria pollutants. As shown in Table 4-2,

the Proposed Action would generate emissions well below conformity *de minimis* limits as specified in 40 CFR 93.153. Because the emissions generated would be below *de minimis* levels, it is reasonable to assume that the temporary construction emissions caused by the Proposed Action would not cause a violation of the NAAQS and a full Conformity Determination would not be required. Therefore, no significant direct or indirect effects on regional or local air quality would result from implementation of the Proposed Action. Emissions factors, calculations, and estimates of construction-related emissions for the Proposed Action are detailed in Appendix B.

## **Environmental Protection Measures**

The Construct Gasoline Service Station, Auto Hobby Shop, and Car Wash and P2 Rock Crusher projects would require air permitting by the FRAQMD. All necessary permits for these projects would be obtained prior to operating any qualified permitted equipment.

### **4.1.2 No Action Alternative**

Under the No Action Alternative, there would be no change in or effects on air quality at Beale AFB.

## **4.2 Biological Resources**

Determination of the significance of potential impacts on biological resources is based on the importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource, the percentage of the resource that would be affected relative to its occurrence in the region, the sensitivity of the resource to proposed activities, and the duration of ecological ramifications. Impacts on biological resources are significant if species or habitats of high concern are adversely affected over relatively large areas, or if disturbances cause reductions in population size or impact the distribution of a species of high concern.

### **4.2.1 Proposed Action**

During the design phase of the Proposed Action, extensive efforts were made by Beale AFB to avoid and minimize potential construction-related disturbances (direct or indirect) on sensitive habitats and associated special-status plant and wildlife species. Botanical and biological surveys of the project areas were conducted to determine the placement of project features in relation to natural features to avoid undue impacts on biological resources. Because of property boundary and mission-related constraints, Beale AFB had little latitude regarding placement of the proposed project sites, but features were sited to minimize impacts on sensitive natural resources such as vernal pool, other seasonal wetlands, and associated threatened or endangered species. Additional avoidance measures would be used to minimize impacts on vernal pool or seasonal wetland areas.

## Annual Grasslands

Implementation of the Proposed Action would result in a small loss of nonnative grassland habitat during construction. However, Beale AFB has an abundance of comparable grassland habitat in the surrounding area. Therefore, no adverse impacts on grassland habitat would occur from implementation of the Proposed Action.

## Wetland Resources and Special-Status Species

The P2 Rock Crusher and Vernal Pool Restoration Phase 2 projects would result in beneficial effects on threatened and endangered species habitat because there would be a net increase of vernal pools on Beale AFB. Habitat creation and restoration activities under these projects would not contribute to adverse cumulative effects on special status species or their sensitive habitats because no permanent loss of these habitats would occur.

Approximately 0.80 (direct 0.21 and indirect 0.59) acres of potential branchiopod habitat would be impacted by the Proposed Action. In order to minimize or compensate for potential impacts associated with the Proposed Action, approximately 1.59 acres of suitable branchiopod habitat would be preserved and 0.21 acres of suitable branchiopod habitat would be restored (see Table 4-3). A Biological Opinion has been approved by the USFWS for the Proposed Action (Appendix C).

**Table 4-3. Summary of Proposed Action Direct and Indirect Impacts on Branchiopod Habitat and Compensation Requirements**

Project	Impacted Acreage		Preservation Acreage		Restoration Acreage		Total Compensation Requirements
	Direct	Indirect	Direct	Indirect	Direct	Indirect	
Construct Heritage Park	0.21	0.57	0.41	1.13	0.21	0.00	1.75
Construct Visitor Center Main Gate	0.00	0.02	0.00	0.05	0.00	0.00 <sup>a</sup>	0.05
<b>Total Acres</b>	<b>0.21</b>	<b>0.59</b>	<b>0.41</b>	<b>1.18</b>	<b>0.21</b>	<b>0.00</b>	<b>1.80</b>

It is assumed that all vernal pools and depression seasonal wetlands within the project area provide potential habitat for vernal pool tadpole and fairy shrimp. It is further assumed that all wetlands within the Proposed Action area would be directly and permanently impacted by the Proposed Action. These impacts are considered adverse.



**Construct Heritage Park.** Phases 1 to 3 and 5 to 7 of the Construct Heritage Park project would not directly or indirectly affect branchiopod habitat. Therefore, no minimization or compensation measures are required for these phases. However, construction activities associated with Phases 4 and 8 to 10 would directly and indirectly affect about 0.77 acres of branchiopod habitat (see Figure 4-1).

***Environmental Protection Measures to be followed (see below):*** Measures 1–6.

**Upgrade JP-8 Hydrant Pits and Lids.** VELB (a federally listed species) habitat is located adjacent to Pit JP-8-5. During 2005 surveys for VELB on base, the elderberry shrub adjacent to Pit JP-8-5 was determined to have VELB emergent holes, indicating that this shrub is VELB habitat. Environmental protection measures would be followed to protect VELB habitat. In addition, construction activities associated with this project would occur between July and November, which is outside of VELB flight season. Based on informal USFWS site visit and consultation, this project would have no adverse impact on VELB habitat.

***Environmental Protection Measures to be followed (see below):*** Measures 1–5 and 7.

**Construct Visitor Center Main Gate.** Construction activities associated with this project would indirectly affect about 0.02 acres of branchiopod habitat (Figure 4-2). Approximately 0.02 acres of this area are vernal pools. Vernal pools can provide potential habitat for vernal pool tadpole and fairy shrimp, federally listed species.

To minimize or compensate for impacts from construction activities, approximately 0.05 acres of suitable branchiopod habitat would be preserved and no acres of branchiopod habitat would be restored. A total of 0.05 acres of suitable branchiopod habitat would be preserved to compensate for potential effects of the Proposed Action.

***Environmental Protection Measures to be followed (see below):*** Measures 1–6.

**Vernal Pool Restoration Phase 2.** Based on informal USFWS site visits and consultation, potential branchiopod habitat would be temporarily impacted by restoration and construction activities associated with this project. Inoculum collection would occur within existing vernal pools and some existing vernal pools would be deepened to enhance the vernal pool hydrology and biological diversity of each pool. In addition, restoration activities associated with constructing and restoring vernal pools are adjacent to giant garter snake habitat. Based on USFWS consultation, no compensation measures would be required for



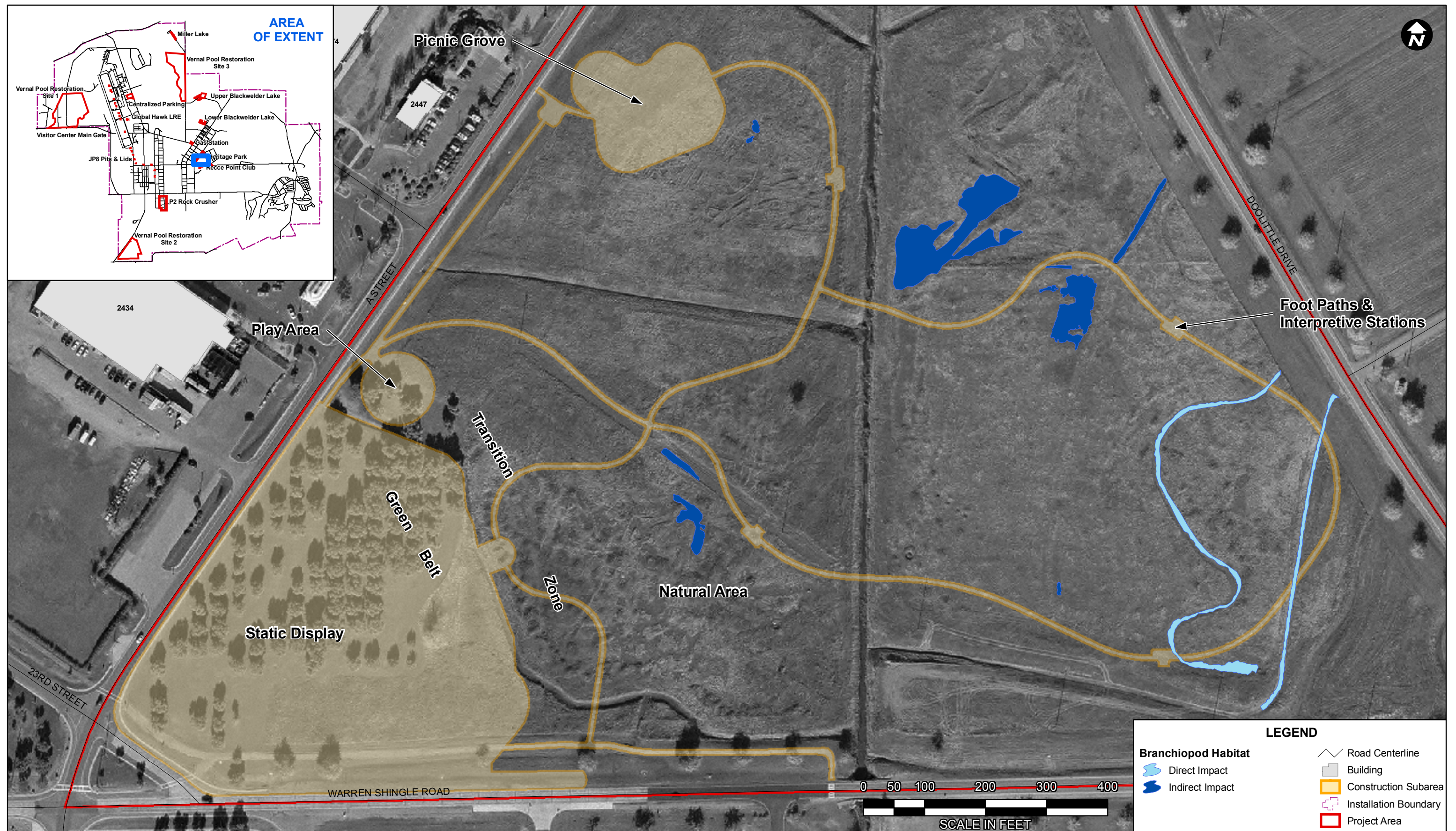
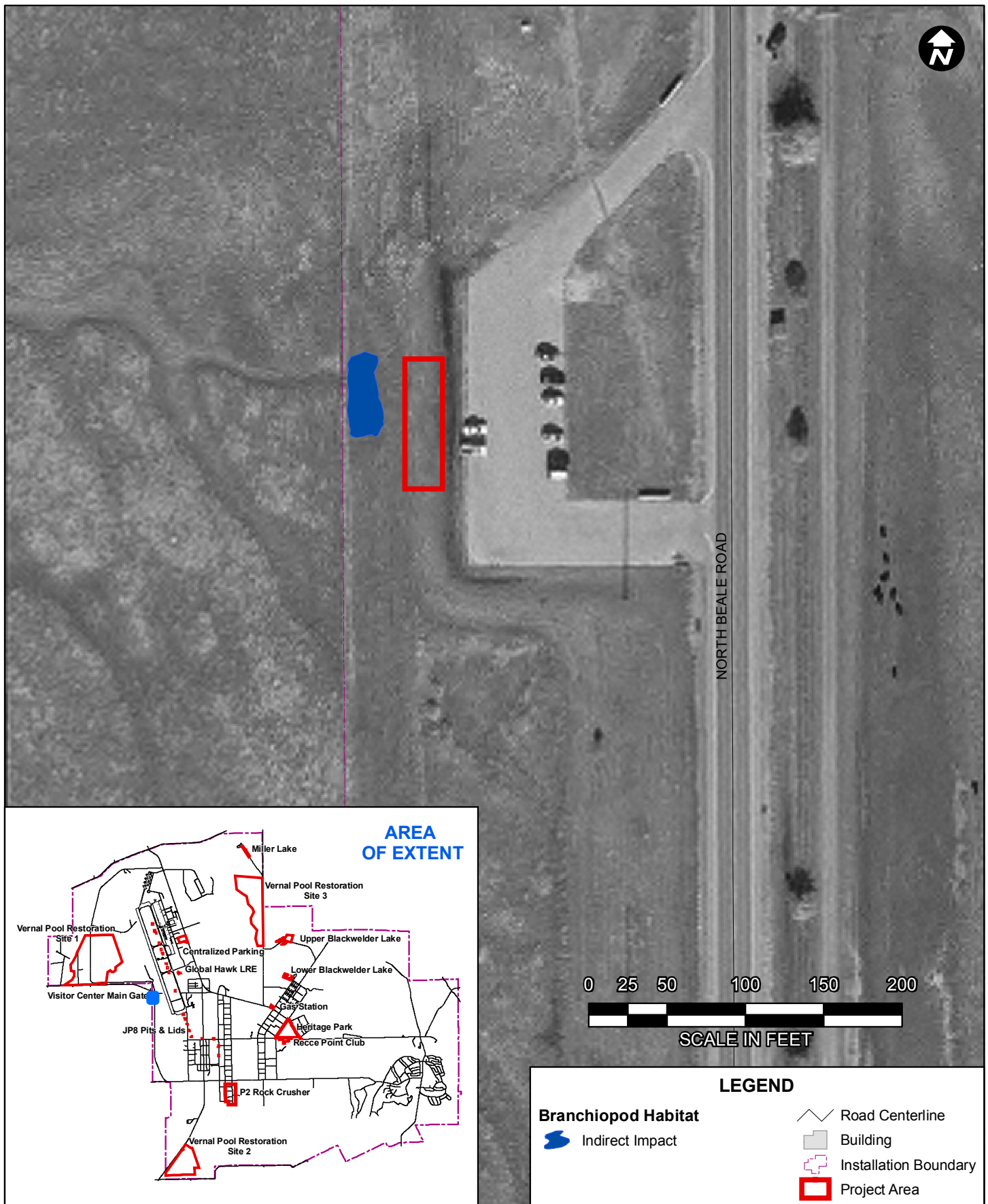


Figure 4-1. Branchiopod Habitat in Vicinity of Construct Heritage Park



***THIS PAGE INTENTIONALLY LEFT BLANK***



**Figure 4-2. Branchiopod Habitat in Vicinity of Construct Visitor Center Main Gate**

*EA of WINDO Implementation Plan  
(FY 04-06) at Beale AFB, CA Volume 2*

*4.0 Environmental Consequences  
August 2005*

work in the vicinity of branchiopod habitat and this project would not impact giant garter snake.

***Environmental Protection Measures to be followed (see below):*** Measures 1–5 and 8.

The following projects are located within the vicinity of wetlands or threatened and endangered species habitat. Based on informal USFWS consultation these projects would not impact threatened or endangered species habitat and no environmental protection measures would be required.

***Install Global Hawk LRE Cables.*** Trenching activities would go directly through five disturbed seasonal wetlands (totaling 0.15 acres). A soil survey (Appendix D) was completed of this project site in February 2005 that determined the depth of a potential hard pan clay layer and none was encountered down to 2 feet below ground surface. Based on informal USFWS consultation, this project is considered to have no impacts on disturbed seasonal wetlands because trenching activities would not puncture the clay hardpan soil layer, therefore, not compromising the integrity of these wetlands. In addition, these disturbed seasonal wetlands are not considered potential branchiopod habitat because these wetlands would not hold water for sufficient time to be considered habitat. Therefore, no environmental protection measures would be required.

***Construct Gas Service Station, Auto Hobby Shop, and Car Wash.*** Two disturbed seasonal wetlands are located north of the project site. This project was designed to allow at least a 55-foot buffer between the limits of construction and potential branchiopod habitat. These wetlands would not be directly or indirectly impacted by construction activities because they are upslope of the project site. Wetlands would be flagged and orange fencing would be placed around these wetlands to further protect these habitat areas from potential impacts. Therefore, no environmental protection measures would be required.

***Upgrade JP-8 Hydrant Pits and Lids.*** Potential branchiopod habitat is within the vicinity of this project. Therefore, construction access routes and activities have been modified so that all activities would be outside potential habitat impact areas. Based on informal USFWS site visits and consultation, no potential branchiopod habitat would be impacted by these construction activities.

***Construct Flightline Centralized Parking South Access Road.*** Potential branchiopod habitat is within the vicinity of this project. Although, no formal design is available for this project, the final road layout would be designed to avoid this habitat. All project designs would be coordinated with Environmental Flight to ensure that no impact to this habitat would occur. Based on informal USFWS site visits and consultation, no potential branchiopod habitat would be impacted by these construction activities.



**P2 Rock Crusher.** Potential branchiopod habitat is within the vicinity of this project. After debris and surface concrete removal is completed, disturbed seasonal wetlands in the project area would be restored by hydrologically connecting wetlands that are currently fragmented and unnatural in shape. The contractor that restores these wetlands would ensure that the slope, size, and depth of the newly restored wetlands mimic naturally occurring wetlands on the base. Based on informal USFWS site visits and consultation, no potential branchiopod habitat would be impacted by these construction activities.

## **Environmental Protection Measures**

The environmental protection measures specified below were developed through 9 CES/CEV's close collaboration with the USFWS in site visits, teleconferences, and meetings. Environmental protection measures for the Proposed Action are specified in an USFWS approved Biological Opinion (Appendix C).

**Measure 1: Monitor Construction Activities.** A qualified biologist from 9 CES/CEV would monitor all construction activities and the proposed work to ensure compliance with avoidance, minimization, and compensation components of the Proposed Action. The biological monitor would assist construction personnel in compliance with all conservation measures and guidelines. The monitor would be responsible for directing the placement of all stakes, flags, and barriers protecting sensitive resources.

**Measure 2: Conduct Environmental Awareness Training.** The biological monitor from 9 CES/CEV would conduct environmental awareness training for construction crews before and during project implementation. The education program would briefly cover threatened and endangered species and their habitats that might be encountered during construction or be within close proximity of the Proposed Action project sites. Awareness training would cover all restrictions and guidelines that must be followed by construction crews to avoid or minimize impacts on threatened and endangered species and their habitat. Environmental awareness training would be conducted prior to construction, when crews are about to enter potentially sensitive areas and when new personnel join the construction crews.

Restrictions and guidelines to be observed by construction crews include the following:

- Construction activities would only be allowed from May 1 to October 1.
- All vehicle operators would observe the posted speed limit on paved roads and a 20-mile per hour speed limit on unpaved roads.
- Off-road travel by vehicles or construction equipment would be prohibited outside of designated work areas.

- No non-military firearms or pets would be allowed in the Proposed Action area.
- Motor vehicles and equipment would be fueled and serviced in designated service areas.
- Any worker who inadvertently kills or injures a special-status species, or finds one injured or trapped, would immediately report the incident to the biological monitor. The biological monitor would inform Environmental Flight (9 CES/CEV). The 9 CES/CEV would verbally notify the USFWS Sacramento Endangered Species Office within 3 days and would provide written notification of the incident within 5 days.

***Measure 3: Stake and Flag Boundaries of Work Areas.*** The contractor would provide all materials to stake and flag boundaries of the project work area. The contractor would coordinate with the biological monitor from 9 CES/CEV to stake and flag the boundaries of all work and staging areas in portions that have the potential to support vernal pool tadpole shrimp, fairy shrimp, VELB, giant garter snake, or their habitat. Staking and flagging would be done before construction commences to ensure that construction vehicles, equipment, and personnel would not enter areas that have the potential to be occupied by vernal pool tadpole shrimp, fairy shrimp, VELB, giant garter snake, or their habitat. The contractor would remove all stakes and flagging within 60 days of construction completion.

***Measure 4: Stake and Flag Boundaries of Adjacent Vernal Pools and Other Wetlands.*** Potential threatened and endangered species habitat adjacent to the construction area would be protected by the contractor placing orange barrier material or stakes and flagging around the perimeter of the threatened and endangered species habitat in coordination with the biological monitor from 9 CES/CEV. The contractor would provide all materials to fence, stake, and flag boundaries of the adjacent vernal pools and other wetlands. The location of these barriers would be clearly marked on construction plans and their placement would be supervised by the biological monitor from 9 CES/CEV.

***Measure 5: Disposal of Excavated Soil.*** All soil excavated during construction of projects occurring in potential branchiopod habitat should be removed and disposed of outside the project area by the contractor. Coordination with 9 CES/CEV and appropriate regulatory requirements is required prior to disposing of this excavated soil.

***Measure 6: Compensation for Direct and Indirect Impacts on Branchiopod Habitat.*** The project proponent should avoid, minimize, or compensate for project-related impacts on branchiopod habitat. According to the USFWS Programmatic Biological Opinion, projects must compensate for adverse effects on the habitat of listed vernal pool invertebrates by preserving unaffected habitat and restoring new habitat that is eliminated as a result of the Proposed Action (BAFB 2002).

- For every acre of habitat directly affected by the Proposed Action, 2 acres of branchiopod habitat (vernal pools and depressional seasonal wetlands) would be preserved and 1 acre would be restored on Beale AFB or at another ecosystem preservation bank approved by the USFWS.
- For every acre of branchiopod habitat indirectly affected by the Proposed Action, 2 acres of similar branchiopod habitat would be preserved on Beale AFB or at another ecosystem preservation bank approved by the USFWS.

To minimize or compensate for potential impacts from the Proposed Action, approximately 2.05 acres of suitable branchiopod habitat would be preserved and 0.44 acres of suitable branchiopod habitat would be restored (see Table 4-3) by 9 CES/CEV. Because of water flows and the presence of vertebrate and invertebrate predators, all other type of waters of the U.S. would not likely provide habitat for the vernal pool tadpole and fairy shrimp. Therefore, measures to minimize or compensate for impacts on these wetland types have not been proposed.

***Measure 7: Protection of VELB Habitat.*** To minimize construction impacts, a minimum 50-foot buffer zone surrounding the elderberry shrub would be flagged by the biological monitor from 9 CES/CEV and the area within 100 feet of the project area would be reseeded by the contractor with native vegetation to the best extent possible after construction activities. In addition, erosion and sedimentation and dust control measures would be used during construction and restoration, such as frequent watering of the project site, using orange fencing and hay bails, and delaying soil disturbance activities during high wind conditions. The contractor would provide all materials to fence, flags, and hay bails. Placement of these materials and reseeded procedures should be coordinated with 9 CES/CEV.

***Measure 8: Protection of Giant Garter Snake Habitat.*** To protect potential giant garter snake habitat in and adjacent to Vernal Pool Restoration Phase 2/Site 1 during construction activities, the following minimization measures would be implemented by the contractor and coordinated with 9 CES/CEV:

- Avoid construction activities within 200 feet from the banks of Reeds Creek.
- Construction activities would be restricted between May 1 and October 1. This is the active period for giant garter snake.
- Giant garter snake habitat would be flagged and this area would be avoided by all construction personnel and equipment.

#### **4.2.2 No Action Alternative**

Under the No Action Alternative, there would be no change in or effects on biological resources at Beale AFB. In addition, vernal pools would not be restored at the proposed sites. Past actions on Beale AFB required restoration of vernal pool areas to compensate for direct and indirect impacts on vernal pools. If the vernal pool areas are not restored, the base would not be in compliance with USACE and USFWS restoration requirements and would be fined. In addition, future construction projects would be jeopardized if the base fails to complete this project. This could impact the base's ability to support new mission beddowns and other mission requirements that involve construction.

### **4.3 Water Resources**

Evaluation criteria for water resources impacts are based on water availability, quality, and use; existence of floodplains; and associated regulations. An impact on water resources would be significant if it were to reduce water availability to existing users or interfere with the supply, create or contribute to overdraft of groundwater basins, exceed safe annual yield of water supply sources, adversely affect water quality or endanger public health by creating or worsening adverse health hazard conditions, threaten or damage unique hydrologic characteristics, or violate established laws or regulations that have been adopted to protect or manage water resources of an area. The impact of flood hazards on a proposed action is significant if such an action is proposed in an area with a high probability of flooding.

#### **4.3.1 Proposed Action**

##### **Surface Waters**

Implementation of the Proposed Action is expected to have no direct or indirect adverse effects on water quality. The Proposed Action would minimally increase the impervious surface area and runoff on the installation. Storm water runoff would flow into drainage systems that are of sufficient capacity. With adherence of best management practices, adverse effects from erosion would be avoided. Therefore, significant impacts to surface waters would not be expected as a result of the Proposed Action.

##### **Jurisdictional Waters of the U.S**

To calculate impacts to jurisdictional waters of the U.S., only those areas that would be directly impacted by filling, grading, or compacting are assessed. A total of 13.69 acres of jurisdictional waters of the U.S. would be impacted by the Proposed Action. Section 401 and 404 permit applications have been submitted to the USACE, Sacramento District and the CRWQCB, Central Valley Region for Install Global Hawk LRE Cables and Erosion Control at Upper Blackwelder Lake projects. Copies of these

submittal letters are provided in Appendix E. Construct Heritage Park, Vernal Pool Restoration Phase 2, Construct Visitor Center Main Gate, Erosion Control at Miller Lake, and Erosion Control at Lower Blackwelder Lake projects would submit Section 401 and 404 permit applications once project designs are complete. Approval of the Section 401 and 404 permit applications would be obtained prior to commencement of construction activities.

***Construct Heritage Park.*** Construction of the static display and green belt portion of the Heritage Park project would not impact jurisdictional waters of the U.S. However, construction activities associated with the transition zone and natural areas would directly affect about 0.19 acres of jurisdictional waters of the U.S. (Figure 4-3).

***Environmental Protection Measures to be followed (see below):*** Measures 1 and 2.

***Install Global Hawk LRE Cables.*** Construction activities associated with this project would impact about 0.02 acres of jurisdictional waters of the U.S. (Figure 4-4).

***Environmental Protection Measures to be followed (see below):*** Measures 1 and 2.

***Vernal Pool Restoration Phase 2.*** Construction activities associated with this project would impact about 12.00 acres of jurisdictional waters of the U.S. (Figures 4-5, 4-6, and 4-7).

***Environmental Protection Measures to be followed (see below):*** Measures 1 and 2.

***Construct Visitor Center Main Gate.*** Construction activities associated with this project would impact about 0.05 acres of jurisdictional waters of the U.S. (Figure 4-8).

***Environmental Protection Measures to be followed (see below):*** Measures 1 and 2.

***Erosion Control at Upper Blackwelder Lake.*** Construction activities associated with this project would impact about 0.12 acres of jurisdictional waters of the U.S. (Figure 4-9).

***Environmental Protection Measures to be followed (see below):*** Measures 1 and 2.

***Erosion Control at Miller Lake.*** Construction activities associated with this project would impact about 0.69 acres of jurisdictional waters of the U.S. (Figure 4-10).

***Environmental Protection Measures to be followed (see below):*** Measures 1 and 2.

***THIS PAGE INTENTIONALLY LEFT BLANK***

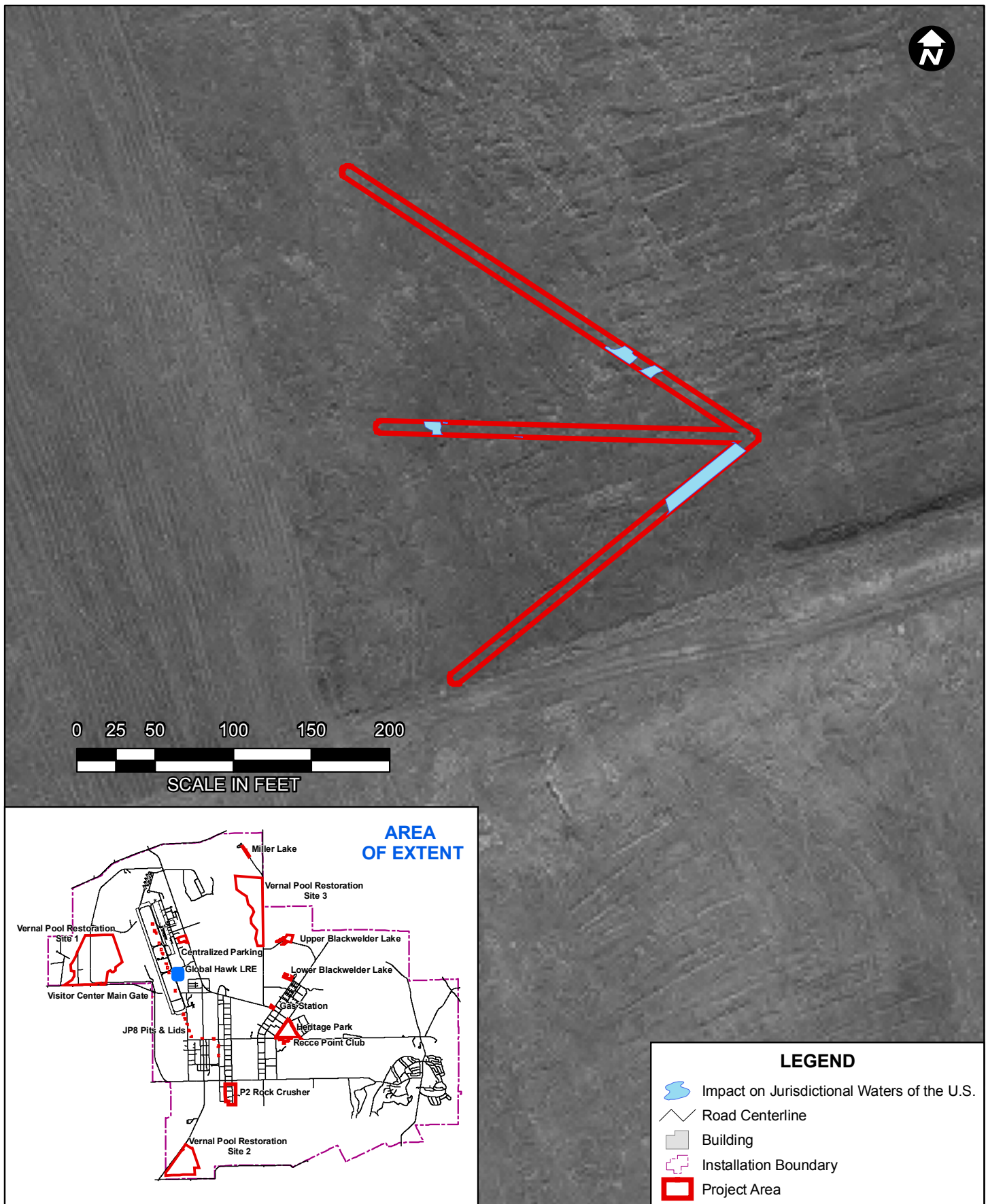




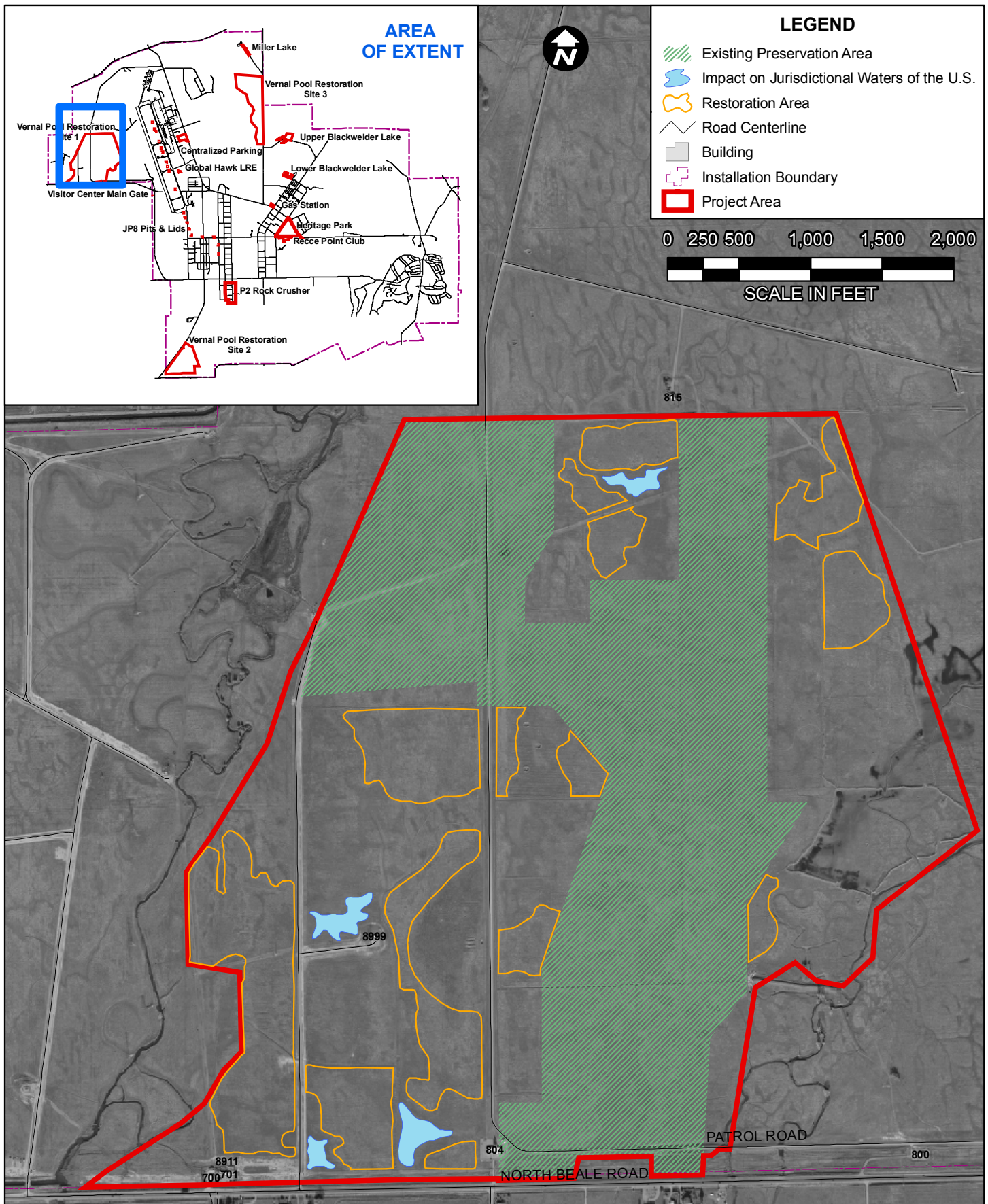
Figure 4-3. Jurisdictional Waters of the U.S. Impacted by Construct Heritage Park



***THIS PAGE INTENTIONALLY LEFT BLANK***

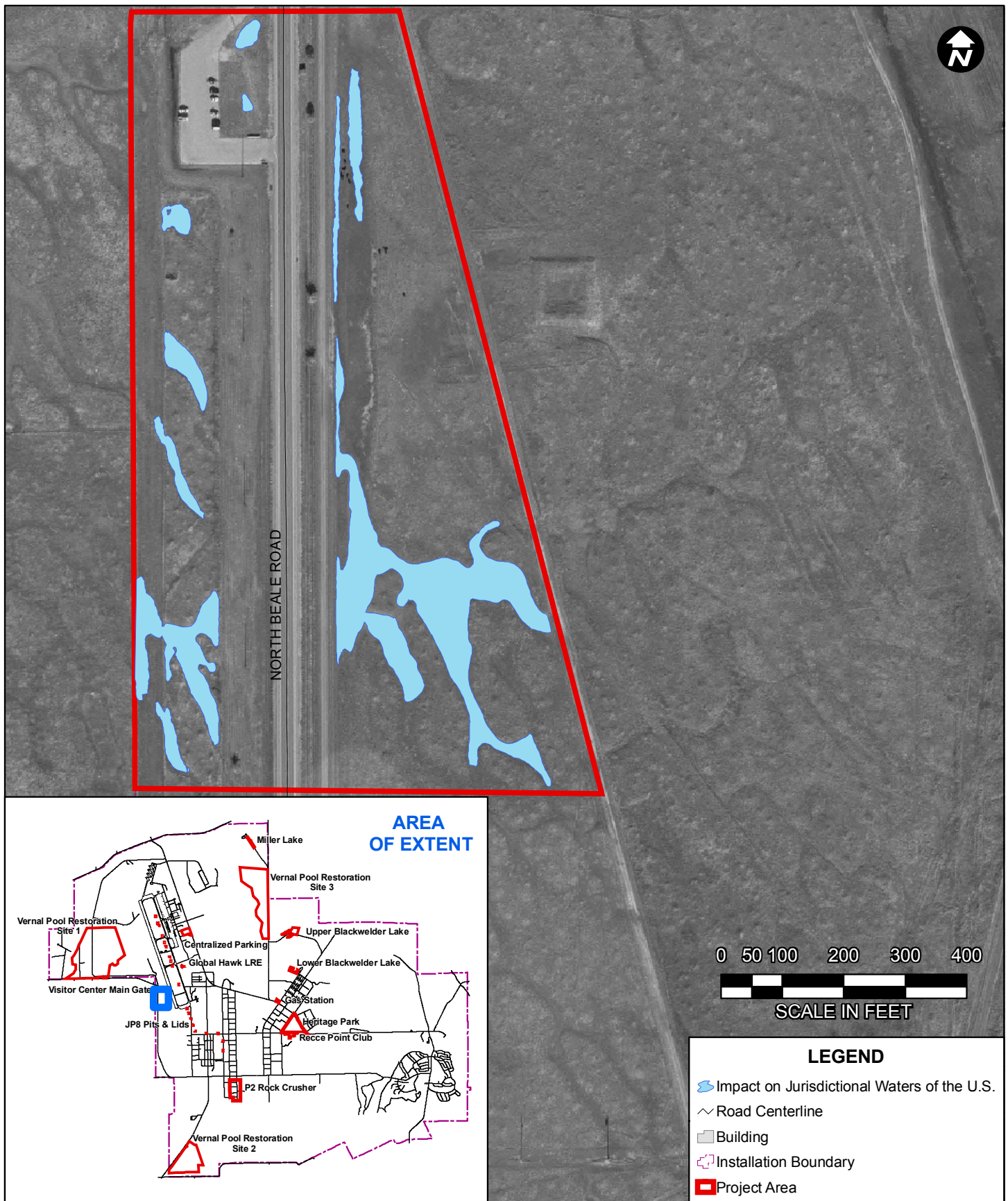


**Figure 4-4. Jurisdictional Waters of the U.S. Impacted by Install Global Hawk LRE Cables**



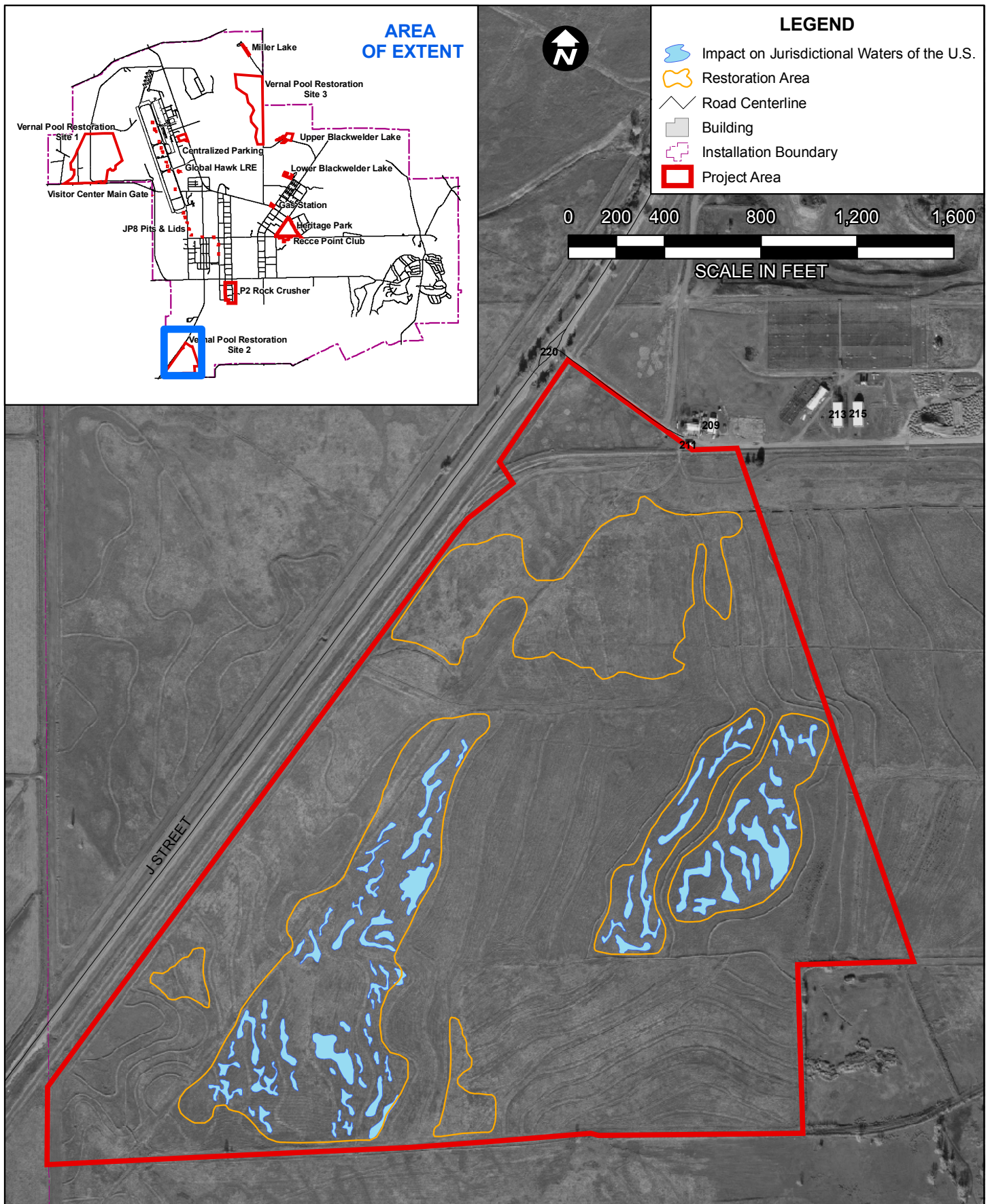
**Figure 4-5. Jurisdictional Waters of the U.S. Impacted by Vernal Pool Restoration Phase 2/Site 1**





**Figure 4-6. Jurisdictional Waters of the U.S. Impacted by Vernal Pool Restoration Phase 2/  
Inoculum Collection Near Main Gate**



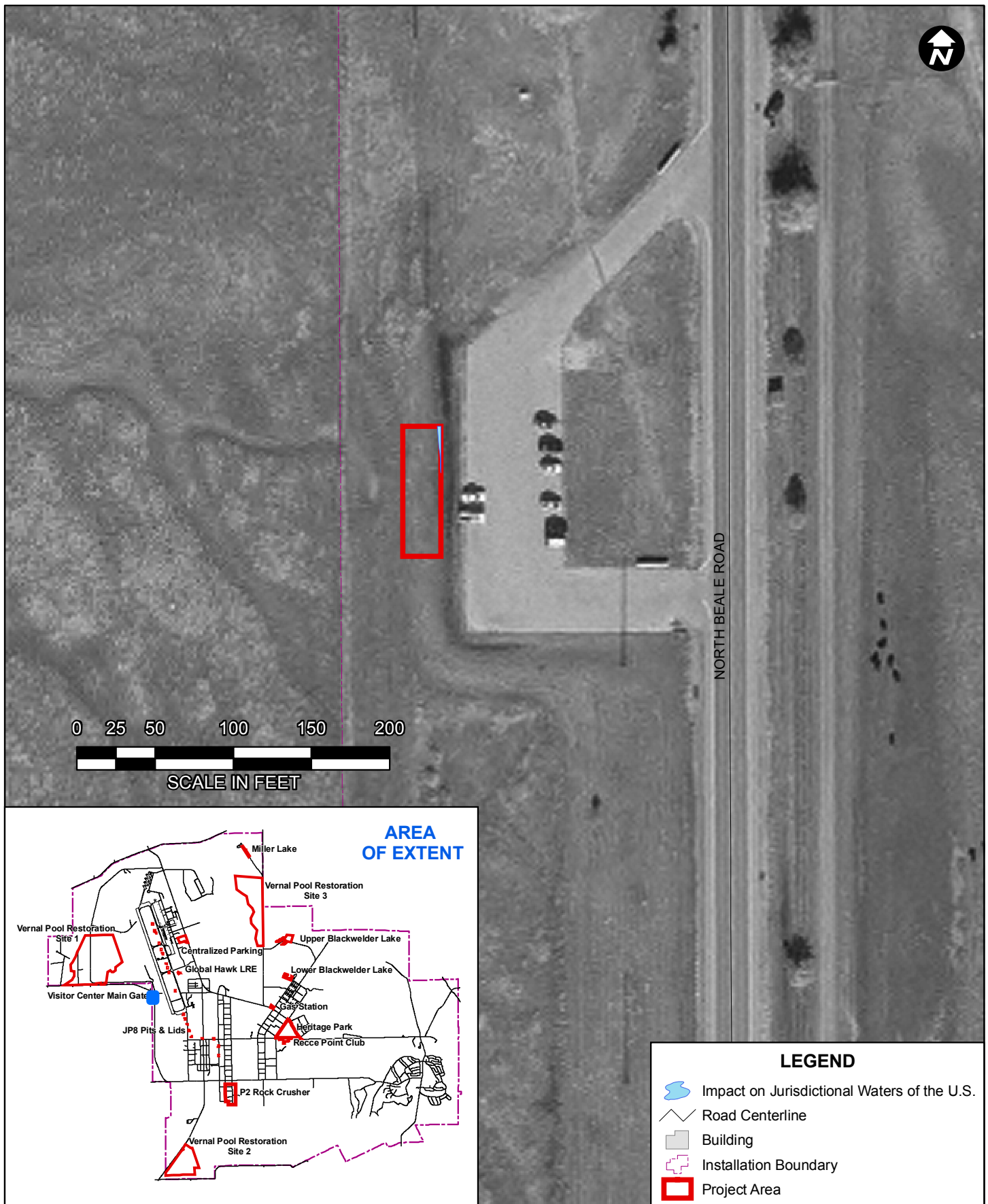


**Figure 4-7. Jurisdictional Waters of the U.S. Impacted by Vernal Pool Restoration Phase 2/Site 2**

EA of WINDO Implementation Plan  
(FY 04-06) at Beale AFB, CA Volume 2

4.0 Environmental Consequences  
August 2005

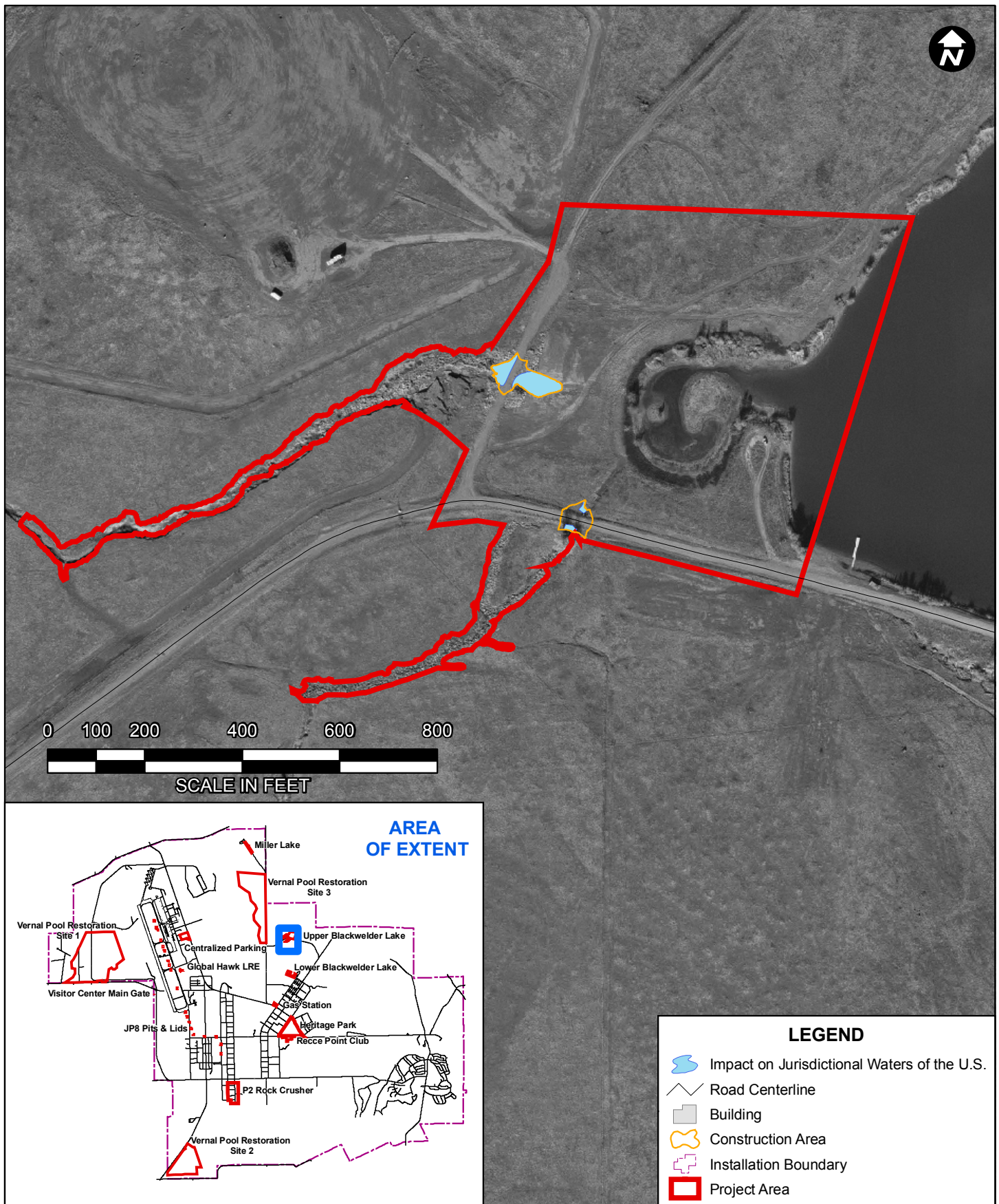




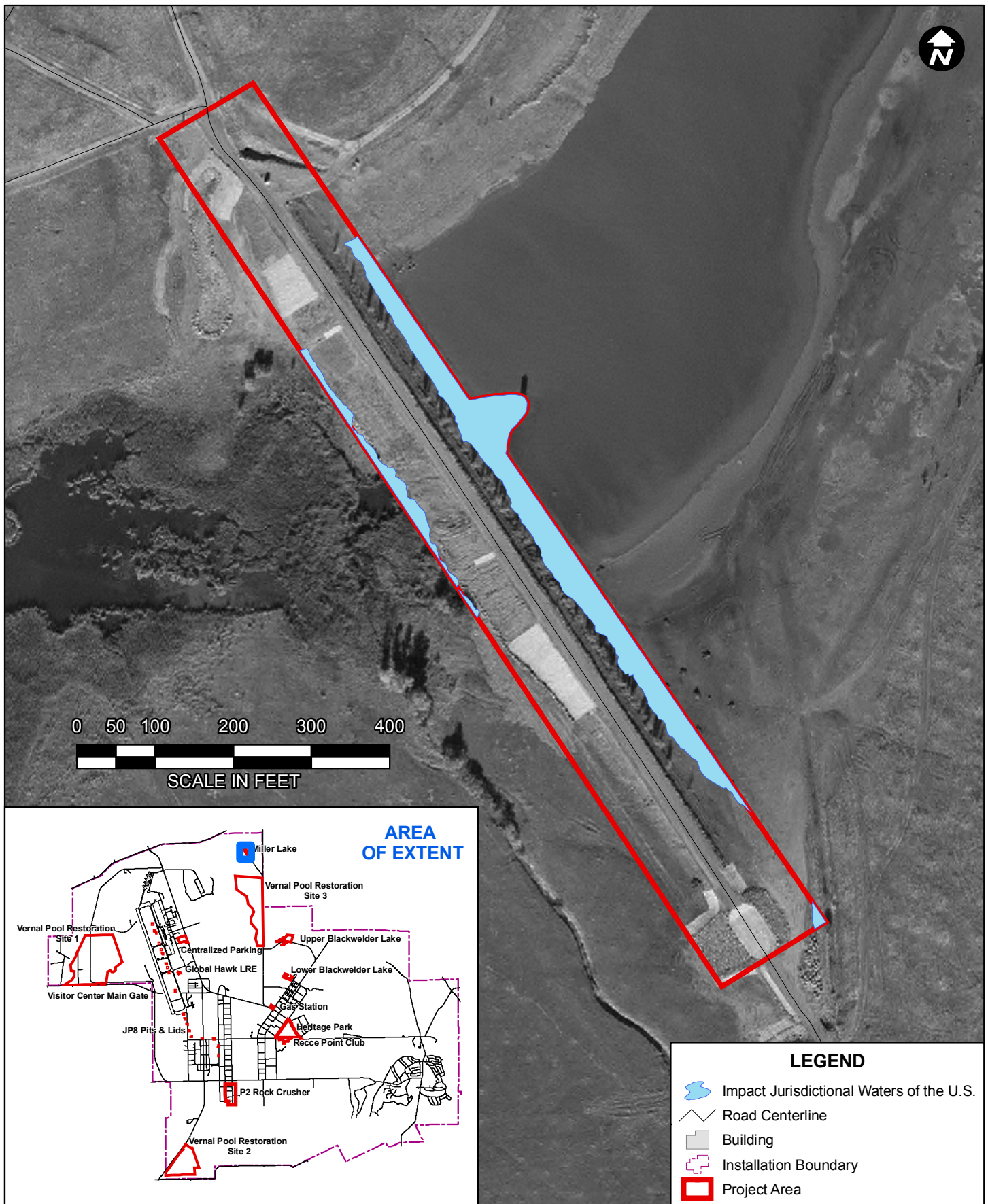
**Figure 4-8. Jurisdictional Waters of the U.S. Impacted by Construct Visitor Center Main Gate**

EA of WINDO Implementation Plan  
(FY 04-06) at Beale AFB, CA Volume 2

4.0 Environmental Consequences  
August 2005







**Figure 4-10. Jurisdictional Waters of the U.S. Impacted by Erosion Control at Miller Lake**

***Erosion Control at Lower Blackwelder Lake.*** Construction activities associated with this project would impact about 0.63 acres of jurisdictional waters of the U.S. (Figure 4-11).

***Environmental Protection Measures to be followed (see below):*** Measures 1 and 2.

## **Groundwater**

None of the activities associated with the Proposed Action would affect groundwater quality.

## **Floodplains**

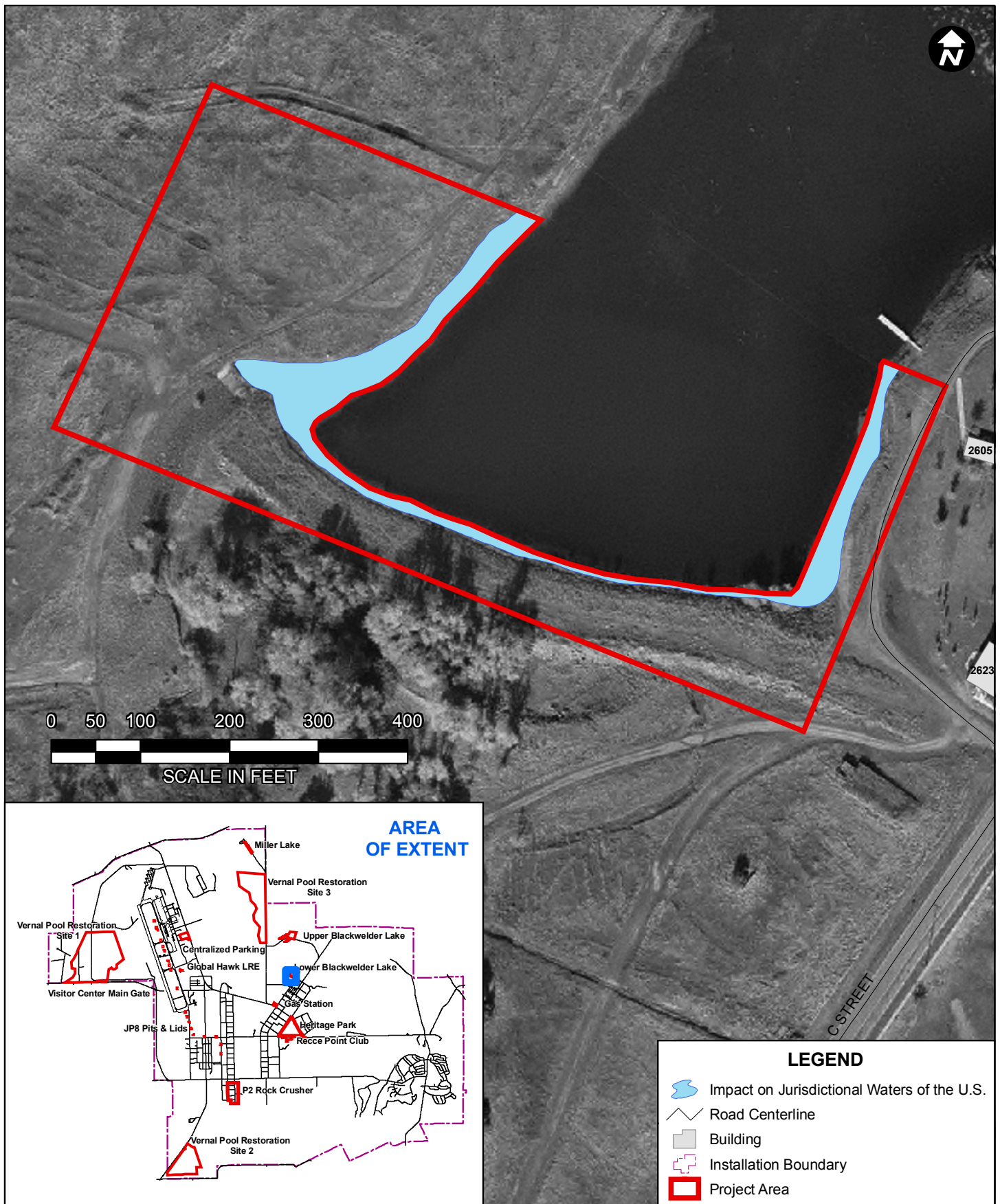
The Proposed Action involves construction projects within portions of the 100-year floodplain on Beale AFB (see Figure 3-2). The USAF is preparing a Finding of No Practicable Alternative (FONPA) attesting that there are no practicable alternatives that would allow the proposed construction of the Proposed Action with fewer impacts on floodplains. Table 4-5 describes the amount of the proposed projects that would occur within portions of the 100-year floodplain (see Figure 3-2).

As shown in Table 4-5, the Proposed Action would impact approximately 11.64 acres of the 100-year floodplain. During construction, impacts would be kept as minimal as possible by using best available control measures. In addition, the Proposed Action would be designed to allow adequate storm water drainage and free flow of water during rain events. Therefore, the Proposed Action would have no adverse impact on floodplains on Beale AFB.

Vernal Pool Restoration Phase 2, Erosion Control at Upper Blackwelder Lake, Erosion Control at Miller Lake, and Erosion Control at Lower Blackwelder Lake would have a positive affect on floodplains on Beale AFB. These projects would increase surface water storage, improve water quality by increasing filtration capabilities, and repair areas of excessive erosion.

**Table 4-5. Project Area Affecting 100-Year Floodplain**

<b>Project</b>	<b>Total Acreage of Project Within 100-Year Floodplain</b>
Construct Heritage Park	3.83
Upgrade JP-8 Hydrant Pits and Lids	0.72
Repair Force Protection at Recce Point Club	7.09
<b>Total Acres</b>	<b>11.64</b>



**Figure 4-11. Jurisdictional Waters of the U.S. Impacted by Erosion Control at Lower Blackwelder Lake**



## Environmental Protection Measures

***Measure 1: Best Management Practices.*** The contract would adhere to best management practices and applicable codes and ordinances to reduce storm water runoff-related impacts on a level of insignificance. The following best management practices would be followed by the contractor prior and during construction activities:

- Construction activities would only be allowed from May 1 to October 1.
- Erosion and sediment controls would be in place during construction to reduce and control siltation or erosion impacts on areas outside of the proposed construction sites.
- All vehicle operators would observe the posted speed limit on paved roads and a 20-mile per hour speed limit on unpaved roads.
- Off-road travel by vehicles or construction equipment would be prohibited outside of designated work areas.
- Motor vehicles and equipment would be fueled and serviced in designated service areas.

***Measure 2: Disposal of Excavated Soil.*** All soil excavated during construction of projects occurring in jurisdictional waters of the U.S. should be removed and disposed of by the contractor outside the project area. Coordination with 9 CES/CEV is required prior to disposing of this excavated soil.

### 4.3.2 No Action Alternative

Under the No Action Alternative, there would be no change in or effects on water resources at Beale AFB.

## 4.4 Cultural Resources

The analysis of the potential impacts and adverse effects on cultural resources associated with proposed actions on Federal property includes the assessment of both direct and indirect impacts on cultural resources and the determination of their potential to result in adverse effects on identified historic properties or unevaluated, potentially eligible resources. Adverse effects include physically altering, damaging, or destroying; altering a defining characteristic that is a contributing element to the eligibility of; the introduction of visual or audible elements that are out of character or affect the original setting of; or the intentional or benign neglect of a historic property or potentially eligible resource that results in its full or partial destruction. Adverse effects associated with indirect impacts typically include the cumulative effects of the intensified use of an area in which a historic property or unevaluated resource is

located resulting from construction or project-related improvement of the area, including improvements to transportation corridors in the vicinity that provide for or indirectly lead to increased access to the area.

#### 4.4.1 Proposed Action

There is the potential for impacts to cultural resources associated with the Proposed Action. There would be no adverse effects to cultural resources associated with the Proposed Action. No historic properties have been identified within the APE, potentially impacted sites have been previously determined to be ineligible for nomination to the NRHP, and no ground-disturbing construction will occur within the boundaries of unevaluated, potentially eligible sites. Table 4-7 contains a summary of the potential impacts and absence of adverse effects on cultural resources within the boundary of the Proposed Action. Avoidance of identified cultural resources and implementation of the SOPs contained in the Beale AFB CRMP (BAFB 1998) and the cultural resources protection measures contained in this section would ensure that potential impacts associated with the Proposed Action do not result in adverse effects on potentially eligible cultural resources.

**Table 4-7. Summary of Impacts on Cultural Resources Within the Boundary of the Proposed Action**

<b>Project</b>	<b>Site Number</b>	<b>Within APE of Proposed Action</b>	<b>Potential for Impact</b>	<b>NRHP Eligibility</b>	<b>Adverse Effect</b>
Upgrade JP-8 Hydrant Pits and Lids	AH-56	Yes	Yes	Not Eligible	No
Vernal Pool Restoration Phase 2/Site 3	AH-63	Yes	No	Potentially Eligible	No
P2 Rock Crusher	AH-29	Yes	Yes	Not Eligible	No

Previously unidentified subsurface archaeological deposits might exist within the boundary of the Proposed Action. Implementation of the Standard Operating Procedures (SOPs) for the inadvertent discovery of cultural resources that are contained in the Beale AFB CRMP (BAFB 1998) and the cultural resources protection measures outlined in this section would ensure that any inadvertent discovery of cultural resources is handled appropriately there are no indirect impacts or adverse effects on unknown, potentially eligible cultural resources.

***Upgrade JP-8 Hydrant Pits and Lids.*** The proposed upgrades for the JP-8 hydrant pits and lids project represent a potential impact on archaeological site AH-56. Ground disturbing construction associated

with the proposed removal and upgrading of one of the JP-8 hydrant pits within the boundary of this archaeological site cannot be avoided. This site consists of the remains of the Women's Army Corps (WAC) housing area of the Camp Beale World War II Western Cantonment. Since Archaeological Site Ah-56 is ineligible for nomination to the NRHP (BAFB 1998), the Proposed Action would have no adverse effect on historic properties.

***Environmental Protection Measures to be followed (see below):*** Measures 2 and 3.

***Vernal Pool Restoration Phase 2.*** Restoration activities at Vernal Pool Restoration Phase 2/Site 3 have the potential to impact archaeological site AH-63, which is within the APE of this component of the Proposed Action. This site represents the remains of a historic, pre-military era farmstead consisting of rock foundations remains and scattered domestic debris. The potential NRHP eligibility of this site has not been evaluated, and it must be considered and treated as potentially eligible. Project engineers and field crew supervisors would coordinate all project designs and implementation of the Vernal Pool Restoration Phase 2/Site 3 with 9 CES/CEV to avoid ground-disturbing construction actions within the boundary of this archaeological site. All ground-disturbing activities associated with this component of the Proposed Action that would occur within 100 feet of this archaeological site would be monitored by a qualified archaeologist that meets the Secretary of the Interior standards for persons conducting cultural resource management activities on Federal property. The implementation of the SOPs outlined in the Beale AFB CRMP (BAFB 1998) and the cultural resources protection measures contained in this section would ensure that there are no adverse effects on archaeological site AH-63 and that any inadvertent discovery of cultural resources outside of the site boundary would be handled appropriately.

***Environmental Protection Measures to be followed (see below):*** Measures 1–4.

***P2 Rock Crusher.*** There is a potential for impacts on archaeological site AH-29, which is within the APE of this component of the Proposed Action. The boundary of this archaeological site is roughly contiguous with the boundary of the P2 Rock Crusher project. This site represents the remains of a portion of the Camp Beale World War II Central Cantonment area that includes a World War II era German prisoner-of-war facility. Since Archaeological site AH-29 is ineligible for nomination to the NRHP (SHPO 1994; BAFB 1998), the Proposed Action would have no adverse effect on historic properties.

***Environmental Protection Measures to be followed (see below):*** Measures 1 and 2.

## **Environmental Protection Measures**

***Measure 1: Project Modification and Avoidance of Cultural Resources.*** Modifying the Proposed Action to avoid ground-disturbing construction actions within the boundaries of unevaluated, potentially NRHP-eligible sites within the APE; and/or restricting ground-disturbing activities associated with the Proposed Action that would occur within the boundaries of potentially eligible sites to previously disturbed areas would reduce potential impacts to a level of no adverse effect.

***Measure 2: Cultural Resources Awareness Training.*** All construction and maintenance personnel would receive cultural resources awareness training by 9 CES/CEV regarding the appropriate work practices necessary to effectively protect cultural resources. This training would address Federal, state, and local laws regarding cultural resources; the importance of these resources and the purpose and necessity of protecting them; and the appropriate methods for reporting and protecting inadvertently discovered cultural resources.

***Measure 3: Marking of Cultural Resource Boundaries.*** The boundaries of all archaeological sites that are within the boundaries of the Proposed Action would be clearly marked by 9 CES/CEV with highly visible temporary markers prior to construction in order to facilitate avoidance and any necessary monitoring. All flagging would be provided by the contractor. All archaeological site markings would be removed by 9 CES/CEV during construction cleanup.

***Measure 4: Cultural Resources Monitoring.*** All ground-disturbing activities within 100 feet of previously recorded archaeological sites would be monitored by a qualified archaeologist that meets the Secretary of the Interior standards for persons conducting cultural resource management activities on Federal property. Any inadvertently discovered cultural resources would be evaluated for NRHP eligibility in order to determine appropriate treatment measures.

***Measure 5: Development and Implementation of an HPTP.*** An HPTP would be developed for any identified historic properties that have the potential to be adversely affected by the Proposed Action, in accordance with NHPA (Section 106 and 36 CFR Part 800, Protection of Historic Properties, revised 2000), and ARPA, as amended (16 U.S.C. 470aa–470mm), as defined in Section 36 CFR 60.4. The HPTP would include detailed information regarding identified historic properties that could be adversely affected by the Proposed Action, and would contain a detailed work plan establishing the parameters of the appropriate mitigation of potential adverse effects on identified historic properties. If data recovery were to be recommended as mitigation for potential adverse effects on identified historic properties, a

research design and methodology would be developed and submitted for SHPO approval, in accordance with NHPA and ARPA guidelines for archaeological data recovery activities on Federal property.

#### **4.4.2 No Action Alternative**

Under the No Action Alternative, the 12 components of the Proposed Action would not be implemented and there would be no changes to cultural resources within the boundary of the installation.

### **4.5 Geological Resources**

Protection of unique geological features, minimization of soil erosion, and the siting of facilities in relation to potential geologic hazards are considered when evaluating environmental consequences of a proposed action on geological resources. Generally, impacts can be avoided or minimized if proper construction techniques, erosion control measures, and structural engineering design are incorporated into project development.

#### **4.5.1 Proposed Action**

Under the Proposed Action, construction activities, such as grading, excavation, and recontouring of the soil, would result in direct effects on soil. Implementation of best management practices during construction would limit environmental consequences resulting from construction activities. Therefore, direct or indirect effects on soils, regional or local topography, or physiographic features at the base would not be significant from implementation of the Proposed Action.

#### **Environmental Protection Measures**

Fugitive dust from construction activities should be minimized by watering and soil stockpiling, thereby reducing to negligible levels the total amount of soil exposed. Standard erosion control means (silt fencing, sediment traps, application of water sprays, and revegetation at disturbed areas) would also reduce environmental consequences related to those characteristics.

#### **4.5.2 No Action Alternative**

Under the No Action Alternative, there would be no change in or effects on geological resources at Beale AFB.

### **4.6 Hazardous Materials and Waste Management**

Environmental consequences associated with hazardous material and waste would be significant if the storage, use, transportation, or disposal of these substances were to substantially increase the risk to



human health or exposure to the environment. Impacts from ACM and LBP would be considered significant if Occupational Safety and Health Administration (OSHA) standards were exceeded. Impacts on the ERP could be considered significant if the Federal action disturbed (or created) contaminated sites resulting in adverse effects on human health or the environment.

#### **4.6.1 Proposed Action**

##### **Hazardous Materials and Waste**

Construction activities associated with the Proposed Action would require the use of certain hazardous materials such as paints, welding gases, solvents, preservatives, and sealants. It is anticipated that the quantity of products containing hazardous materials used during the construction of the Proposed Action would be minimal and their use would be of short duration. The quantity of hazardous wastes generated from proposed construction activities would be negligible. Therefore, hazardous materials and wastes at Beale AFB would not be impacted by the proposed construction activities.

##### **ACM and LBP**

It is anticipated that the foundations, walls, and debris piles for the P2 Rock Crusher project could contain ACM and LBPs. Any ACM or LBP encountered during the P2 Rock Crusher demolition and cleanup would be handled in accordance with established USAF policy, the Asbestos Management Plan, and the Lead-Based Paint Management Plan. USAF regulations prohibit the use of ACM and LBPs for new construction. Specifications for new facilities would be in accordance with USAF policies and regulations.

##### **ERP**

Projects included in the Proposed Action are within four open ERP sites: SD-01, WP-16, ST-22, and SD-32 (ACC 2004).

- The Upgrade JP-8 Hydrant Pits and Lids, Construct Flightline Centralized Parking South Access Road, and Vernal Pool Restoration Phase 2/Site 1 projects are within ERP Site SD-01. This site is being treated and monitored for contaminants. Contaminants that might be encountered during construction include jet fuels, oils, and solvents.
- The Erosion Control at Upper Blackwelder Lake project is in ERP Site WP-16. This site is being treated and monitored for contaminants. Contaminants that might be encountered during construction include detonated munitions, explosives, flares, and pyrotechnic devices.

- All projects except Vernal Pool Restoration Phase 2, Erosion Control and Upper Blackwelder Lake, Erosion Control at Miller Lake, and Erosion Control at Lower Blackwelder Lake are in ERP Site ST-22. This site includes many UST sites, some of which are closed or would be prior to construction; and some which are undergoing treatment, monitoring, or investigation. Typical chemical hazards that might be encountered include fuels and fuel components in soils.
- The Upgrade JP-8 Hydrant Pits and Lids, Construct Flightline Centralized Parking South Access Road, and Vernal Pool Restoration Phase 2/Site 1 projects are within ERP Site SD-32. This site is being treated and monitored for contaminants. Contaminants that might be encountered during construction include VOCs and fuel components.

### **Environmental Protection Measures**

Because of the potential for construction workers to be exposed to contamination from ERP sites during construction, it is recommended that a health and safety plan be prepared by the contractor in accordance with OSHA requirements prior to commencement of construction activities on ERP sites. Should contamination be encountered, handling, storage, transportation, and disposal activities would be conducted in accordance with applicable Federal, state, and local regulations; AFIs; and Beale AFB programs and procedures. Workers at the ERP sites listed above should either have OSHA 40-hour Hazardous Waste Operations and Emergency Response training, or a supervisor should have OSHA Site Supervisor certification. Current site-specific information about contamination, UST sites, and ERP infrastructure on and around each project should be obtained prior to construction and site-specific health and safety plans being prepared. Project planning should include protection of ERP infrastructure such as monitoring wells, treatment systems, and conveyance pipes to avoid disruption of clean-up activities.

#### **4.6.2 No Action Alternative**

Under the No Action Alternative, there would be no change in or effects on hazardous materials and wastes at Beale AFB.

### **4.7 Safety and MMRP**

If implementation of the Proposed Action were to substantially increase risks associated with the safety of Beale AFB personnel, contractors, or the local community; or substantially hinder the ability to respond to an emergency, it would represent a significant impact. Impacts were assessed based on the potential effects of construction and demolition activities.

#### **4.7.1 Proposed Action**

##### **Safety**

Short-term, minor direct adverse effects would be expected from the Proposed Action. Implementation of the Proposed Action would slightly increase the short-term risk associated with construction contractors performing work at Beale AFB during the normal workday because the level of such activity would increase. Contractors would be required to establish and maintain safety programs. Projects associated with the Proposed Action would not pose a safety risk to base personnel or activities at the base. The proposed construction projects would enable 9 RW to meet future mission objectives at the base and conduct or meet mission requirements in a safe operating environment.

##### **MMRP**

During construction activities associated with the Proposed Action, construction workers would have a possibility of encountering UXO or CAIS. The *Archives Search Report for Camp Beale Ordnance & Explosive Cleanup Project* (USACE 2001) contained only a partial listing of hazards at munitions response program range sites at Beale AFB. Preliminary assessments and site investigations have yet to be fully undertaken and the extent and character of contamination from UXO on Beale AFB is still being determined.

##### **Environmental Protection Measures**

An ERP waiver approved by HQ ACC is required prior to accomplishing any work on or near a range. The 9 CES/CEV staff would be contacted prior to commencement of construction activities to determine if an ERP waiver is required for the Proposed Action for all proposed work on or near range sites and for safety requirements that would need to be followed during construction.

#### **4.7.2 No Action Alternative**

Under the No Action Alternative, there would be no change in or effects on construction worker safety.

### **4.8 Transportation**

Impacts on transportation are considered to be adverse if the Proposed Action resulted in a substantial increase in traffic, which is defined as more than 50 trips per hour, on local roadways. Project trip generation is based on an estimate of the number of equipment and crew members that would be present during construction activities.

#### **4.8.1 Proposed Action**

The construction phases of the Proposed Action would require delivery of materials to and removal of debris from construction sites. Construction traffic would comprise a small percentage of the total existing traffic and many of the vehicles would be driven to and kept onsite for the duration of construction and demolition, resulting in relatively few additional trips. Furthermore, potential increases in traffic volume associated with proposed construction activities would be temporary. Heavy vehicles are frequently on base roads. Therefore, the vehicles necessary for construction would be expected to have a minor adverse impact on base roads. All road and lane closures would be coordinated with the Security Forces and would be temporary in nature; therefore, no adverse direct or indirect effects on transportation systems would be expected.

#### **Environmental Protection Measures**

No environmental protection measures are required.

#### **4.8.2 No Action Alternative**

Under the No Action Alternative, there would be no change in or effects on traffic at Beale AFB.

## 5.0 Cumulative and Adverse Impacts

---

Cumulative impacts on environmental resources result from incremental effects of the Proposed Action, when combined with other past, present, and reasonably foreseeable future projects in the area. Cumulative impacts can result from individually minor, but collectively substantial, actions undertaken over a period of time by various agencies (Federal, state, and local) or individuals. Informed decision making is served by consideration of cumulative impacts resulting from projects that are proposed, under construction, recently completed, or anticipated to be implemented in the reasonably foreseeable future.

During the timeframe of the Proposed Action, 9 RW might be constructing many of the projects listed in Appendix A. Table 5-1 summarizes potential cumulative effects on resources from the Proposed Action, when combined with other past, present, and future activities.

As seen in Table 5-1, no significant impacts on the environment would be anticipated from the Proposed Action in conjunction with these projects.

### 5.1 Unavoidable Adverse Impacts

Unavoidable adverse impacts would result from implementation of the Proposed Action. None of these impacts would be significant.

**Biological Resources.** The Proposed Action would result in minimal loss of vegetation and wildlife habitat. Because implementation of the Proposed Action would result in temporary or very minor effects on other resources on Beale AFB, the Proposed Action would not contribute to a substantial cumulative effect on other biological resources.

**Energy.** The use of nonrenewable resources is an unavoidable occurrence, although not considered significant. The Proposed Action would require the use of fossil fuels, a nonrenewable natural resource. Energy supplies, although relatively small, would be committed to the Proposed Action or No Action Alternative.

**Geological Resources.** Under the Proposed Action, construction activities, such as grading, excavating, and recontouring of the soil, would result in soil disturbance. Implementation of best management practices during construction would limit environmental consequences resulting from construction activities. Standard erosion control means would also reduce environmental consequences related to construction. Although unavoidable, effects on soils at the base are not considered significant.



**Table 5-1. Cumulative Effects on Resources**

<b>Resource</b>	<b>Past Actions</b>	<b>Current Background Activities</b>	<b>Proposed Action</b>	<b>Known Future Actions</b>	<b>Cumulative Effects</b>
<b>Air Quality</b>	Moderate transitional nonattainment area for O <sub>3</sub> .	Emissions from aircraft, vehicles, and stationary equipment.	Potential dust generation during soil removal, site grading, and construction.	Potential dust generation during soil removal, site grading, and construction.	Continued moderate transitional nonattainment area for O <sub>3</sub> . Actions would be <i>de minimus</i> . Effect not significant.
<b>Biological Resources</b>	Degraded historic habitat of sensitive and common wildlife species.	Beale AFB operations and development impact wildlife habitat.	Minor disturbance of vegetation by construction. Direct, indirect, and temporary effects on threatened and endangered species.	Minor disturbance of vegetation by construction. Direct and indirect effects on threatened and endangered species.	Permanent loss of vegetation and low quality habitat. Direct and indirect effects on threatened and endangered species. Effect not significant.
<b>Water Resources</b>	Surface water quality moderately impacted by development.	Surface water quality moderately impacted by development.	Potential sedimentation from construction activities and minor increase in percentage of impervious surface area.	Potential sedimentation from construction activities and minor increase in percentage of impervious surface area.	Increased impervious area would have negligible effects on storm water discharges and water quality. Effect not significant.
<b>Cultural Resources</b>	Possible destruction of unknown artifacts.	Identification and recordation of historic and cultural resources.	Project could impact ineligible sites and potential eligible historic archaeological sites. However, no adverse impacts would occur.	Project could impact ineligible sites and potentially eligible historic archaeological sites.	Projects could impact ineligible sites and potentially eligible historic archaeological sites. Effect not significant.
<b>Geological Resources</b>	Past Beale AFB development has modified soils.	Beale AFB development modifies soils.	Grading, excavating, and recontouring of the soil would result in further soil disturbance.	Grading, excavating, and recontouring of the soil would result in further soil disturbance.	Impacts would be permanent but localized. Effect not significant.

**Table 5-1. Cumulative Effects on Resources (continued)**

<b>Resource</b>	<b>Past Actions</b>	<b>Current Background Activities</b>	<b>Proposed Action</b>	<b>Known Future Actions</b>	<b>Cumulative Effects</b>
<b>Hazardous Materials and Waste</b>	Mission operations created hazardous materials and waste. Identification and recordation of ERP sites and AOCs.	Mission operations create hazardous materials and waste. Identification and recordation of ERP sites and AOCs.	Construction activities would generate small amounts of hazardous materials and waste. Construction activities would be located within ERP sites.	Construction activities would generate small amounts of hazardous materials and waste.	Small temporary increase in generation of hazardous materials and waste. Effect not significant.
<b>Safety</b>	Portions of the base have been used as active ranges.	Identification and recordation of historic and active ranges.	Short-term effects on construction workers from construction activities and potential UXO.	Short-term effects on construction workers from construction activities and potential UXO.	Short-term effects on construction workers from construction activities and potential UXO. Effect not significant.
<b>Transportation</b>	Traffic infrastructure has been constructed on the base.	Traffic infrastructure currently has been constructed and maintained on the base.	Short-term effects on traffic circulation and road closures from construction activities.	Short-term effects on traffic circulation and road closures from construction activities.	Short-term effects on traffic circulation and road closures from construction activities. Effect not significant.

***Hazardous Materials and Waste.*** The generation of hazardous materials and wastes is unavoidable. However, the generation of hazardous materials and wastes would not significantly increase over baseline conditions and, therefore, is not considered significant.

## **5.2 Compatibility of the Proposed Action and Alternatives with the Objectives of Federal, Regional, State, and Local Land Use Plans, Policies, and Controls**

Impacts on the ground surface as a result of the Proposed Action would occur entirely within the boundaries of Beale AFB. Construction activities would not result in any significant or incompatible land use changes on or off base. The proposed projects have been sited according to future land use zones. Consequently, construction activities would not be in conflict with future base land use policies or

objectives. The Proposed Action would not conflict with any applicable off-base land use ordinances or designated clear zones.

### **5.3 Relationship Between Short-term Use and Long-term Productivity**

Short-term uses of the biophysical components of man's environment include direct construction-related disturbances and direct impacts associated with an increase in population and activity that occurs over a period of less than 5 years. Long-term uses of man's environment include those impacts occurring over a period of more than 5 years, including permanent resource loss.

Several kinds of activities could result in short-term resource uses that compromise long-term productivity. Filling of wetlands or loss of other especially important habitats and consumptive use of high-quality water at nonrenewable rates are examples of actions that affect long-term productivity.

The Proposed Action would not result in an intensification of land use at Beale AFB and in the surrounding area. Development of the Proposed Action would not represent a significant loss of open space. Therefore, it is anticipated that the Proposed Action would not result in any cumulative land use or aesthetic impacts. Long-term productivity of these sites would be increased by the implementation of the Proposed Action.

### **5.4 Irreversible and Irretrievable Commitments of Resources**

The irreversible environmental changes that would result from implementation of the Proposed Action involve the consumption of material resources, energy resources, land, biological habitat, and human resources. The use of these resources is considered to be permanent.

Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that use of these resources would have on future generations. Irreversible effects primarily result from use or destruction of a specific resource that cannot be replaced within a reasonable time frame (e.g., energy and minerals).

**Material Resources.** Material resources used for the Proposed Action include building materials (for construction of facilities), concrete and asphalt (for roads), and various material supplies (for infrastructure). Most of the materials that would be consumed are not in short supply, would not limit other unrelated construction activities, and would not be considered significant.

**Energy Resources.** Energy resources utilized for the Proposed Action would be irretrievably lost. These include petroleum-based products (such as gasoline and diesel), natural gas, and electricity. During

construction, gasoline and diesel would be used for the operation of construction vehicles. During operation, gasoline would be used for the operation of private and government-owned vehicles. Natural gas and electricity would be used by operational activities. Consumption of these energy resources would not place a significant demand on their availability in the region. Therefore, no significant effects would be expected.

***Biological Resources.*** The Proposed Action would result in a minimal loss of vegetation and wildlife habitat on proposed construction sites. However, proposed construction is mostly occurring on already disturbed land.

***Human Resources.*** The use of human resources for construction and operation is considered an irretrievable loss, only in that it would preclude such personnel from engaging in other work activities. However, the use of human resources for the Proposed Action represents employment opportunities and is considered beneficial.

***THIS PAGE INTENTIONALLY LEFT BLANK***



## 6.0 List of Preparers

---

This EA has been prepared under the direction of Beale AFB. The individuals who contributed to the preparation of this document are listed below.

### **engineering-environmental Management, Inc. (e<sup>2</sup>M)**

#### **Mr. Brian Hoppy – Program Manager**

B.S. Biology

Certificate of Environmental Management

Years of Experience: 13

#### **Mr. Sean McCain – Project Manager**

M.B.A. Business Administration

B.S. Forestry and Natural Resources Management

Years of Experience: 11

#### **Ms. Suanne Collinsworth**

M.S. Environmental Sciences and Engineering

B.S. Geology

Certificate of Water Quality Management

Years of Experience: 6

#### **Mr. Ronald E. Lamb**

M.S. Environmental Science

M.A. Political Science/International Economics

B.A. Political Science

Years of Experience: 18

#### **Mr. Raul Reyes**

B.A.A.S. Wildlife Biology

Years of Experience: 8 years

#### **Ms. Gina von Damm Bogart**

M.S. Geology

Years of Experience: 4

#### **Ms. Mary Young**

B.S. Environmental Science

Years of Experience: 2

***THIS PAGE INTENTIONALLY LEFT BLANK***

## 7.0 References

---

- ACC 2004      Air Combat Command (ACC). 2004. *Management Action Plan Beale Air Force Base, California*.
- BAFB 1998      Beale Air Force Base (BAFB). 1998. *Cultural Resources Management Plan for Beale Air Force Base, California*. Prepared by Harding Lawson Associates.
- BAFB 1999      BAFB. 1999. *Integrated Natural Resources Management Plan Beale Air Force Base, California: Volumes I and II*. Prepared by Jones & Stokes.
- BAFB 2000      BAFB. 2000. *General Plan Beale Air Force Base California*. Prepared by Higginbotham/Briggs & Associates.
- BAFB 2001a      BAFB. 2001. *Environmental Assessment Vernal Pool Restoration Beale Air Force Base, California*.
- BAFB 2001b      BAFB. 2001. *Soils Management Plan*. Prepared by engineering-environmental Management, Inc.
- BAFB 2002      BAFB. 2002. *Habitat Conservation and Management Plan for Beale Air Force Base*. Prepared by Jones & Stokes. April 2002.
- CARB 2003      California Air Resources Board (CARB). 2003. *Ambient Air Quality Standards*. Available online: <<http://www.arb.ca.gov/aqs/aaqs2.pdf>>. Accessed May 5, 2005.
- CARB 2005      CARB. 2005. *Area Designations*. Available online: <<http://www.arb.ca.gov/desig/adm/adm.htm>>. Accessed May 5, 2005.
- e<sup>2</sup>M 2005      Engineering-environmental Management, Inc. (e<sup>2</sup>M). 2005. *Wing Infrastructure Development Outlook Wetland Delineation Report*.
- Foothill 2004      Foothill Associates. 2004. *Beale Air Force Base Anti-Terrorism/Force Protection Upgrades Wetland Delineation Report*.
- Jones & Stokes 2001      Jones & Stokes. 2001. *Delineation of Waters of the United States for Areas Potentially Included in the Habitat Conservation and Management Plan for Beale Air Force Base*.
- Sawyer and Keeler-Wolf 1995      Sawyer, Keeler-Wolf. 1995. *A Manual of California Vegetation*. California Native Plant Society Press: Sacramento, CA.
- SHPO 1994      State Historic Preservation Office (SHPO). 1994. *World War II Archaeological Sites at Beale AFB*. 27 September 1994.
- SMAQMD 2004      SMAQMD. 2004. *Guide to Air Quality Assessment in Sacramento County*. Available online: <<http://www.airquality.org/ceqa/2004AQMDCEQAGuidelines.pdf>>. Accessed May 6, 2005.
- URS 2005      URS Corporation. 2005. *Repair of the JP-8 Fuel Hydrant Transfer Pits Jurisdictional Delineation Report*.

- USACE 2001 U.S. Army Corps of Engineers (USACE). 2001. *Archives Search Report: Camp Beale Ordnance & Explosive Cleanup Project*. Prepared by TechLaw, Inc. October 2001.
- USEPA 2005 U.S. Environmental Protection Agency (USEPA). 2005. *Green Book Nonattainment Areas for Criteria Pollutants*. Available online: <<http://www.epa.gov/oar/oaqps/greenbk/>>. Accessed May 5, 2005.
- Wildlands 2005 Wildlands, Inc. 2005. *Beale Air Force Base Supplemental Wetland Delineation*.

**Appendix A**  
**WINDO Implementation Plan Project List**





## **FY 2004 WINDO Projects**

***THIS PAGE INTENTIONALLY LEFT BLANK***

Table A-1 lists the projects programmed for implementation on Beale AFB in FY 2004.

**Table A-1. Projects Programmed for Fiscal Year 2004**

<b>Reference Number</b>	<b>Project Title</b>	<b>Action Category</b>	<b>Project Location</b>	<b>Funding Type</b>	<b>Approval Type/Title</b>
1	Install Pop-Up Barriers, Vassar and Wheatland Gates <sup>1</sup>	Approved	Open Space	AT/FP	CATEX A2.3.12 EIAP #03.58
2	Construct Flightline Water Mains <sup>1</sup>	Approved	Airfield	ENV	Flightline and J Street Renovations EA EIAP #02.11
3	Repair Flightline Water Mains <sup>1</sup>	Approved	Airfield	ENV	Flightline and J Street Renovations EA EIAP #02.11
4	GH Dormitory (96 rooms) <sup>1</sup>	Approved	Housing	MILCON	Global Hawk EA
5	Building 1200/GH Mission Area Study <sup>1</sup>	Approved	Aircraft O&M	MILCON	CATEX A2.3.24 EIAP #03.46
6	Construct PSPTS Storage, RPRP OSS Office Space <sup>1</sup>	Approved	Aircraft O&M	SRMC	CATEX A.2.3.8 EIAP #03.96-98
7	Repair Taxiway F Shoulders <sup>1</sup>	Approved	Airfield	SRMC	CATEX A2.3.10 EIAP #04.13
8	Repair Parking for 940 CES/SVS CBT Facility <sup>1</sup>	Approved	Industrial	Tenants	CATEX A2.3.7 EIAP #04.15
9	Construct JP-8 Truck Receipt Area at Offloading Headers <sup>1</sup>	Approved	Industrial	DESC	CATEX A.2.10 EIAP #04.66
10	SAM, Land Based Discharge System <sup>1</sup>	Approved	Water	ENV	CATEX A2.3.11 Ref EA from 1998 EIAP #04.25
11	Upgrade Dock 3 <sup>1</sup>	Approved	Aircraft O&M	GH	CATEX A.2.3.7 EIAP #04.07
12	Dog Kennel <sup>1</sup>	Approved	Multi-Use	GH	CATEX A2.3.11 Global Hawk EA EIAP #04.47
13	Allied Support for LRE-DGPS <sup>1</sup>	Approved	Open Space	GH	CATEX A2.3.11 Flightline Fire Station EA EIAP #04.11
14	All-weather surface on existing running track <sup>1</sup>	Approved	Outdoor Recreation Areas	QOL	CATEX A2.3.7 EIAP #04.30

Reference Number	Project Title	Action Category	Project Location	Funding Type	Approval Type/Title
15	Construct Reclaimed Water Landscape Irrigation System in Main Base <sup>1</sup>	Approved	Industrial	ENV	CATEX A2.3.12 EIAP #04.79
16	Repair Perimeter Fencing Grass Valley Gate <sup>1</sup>	Approved	Open Space	AT/FP	AT/FP Upgrades EA
17	Repair/Improve Main Gate <sup>1</sup>	Approved	Open Space	AT/FP	AT/FP Upgrades EA
18	Repair/Improve Wheatland Gate <sup>1</sup>	Approved	Open Space	AT/FP	AT/FP Upgrades EA
19	Repair Perimeter Fencing Doolittle Gate <sup>1</sup>	Approved	Open Space	AT/FP	AT/FP Upgrades EA
20	Repair Perimeter Fencing Wheatland Gate Phase 1 <sup>1</sup>	Approved	Open Space	AT/FP	AT/FP Upgrades EA
21	Repair Perimeter Fencing Wheatland Gate Phase 2 <sup>1</sup>	Approved	Open Space	AT/FP	AT/FP Upgrades EA
22	Repair Force Protection, PME Dorms <sup>3</sup>	Proposed	Community	AT/FP	CATEX A2.3.10
23	Construct Force Protection, Contrails Dining Facility <sup>3</sup>	Proposed	Community	AT/FP	CATEX A2.3.10
24	Construct Visitor Center Main Gate <sup>5</sup>	Proposed	Open Space	AT/FP	WINDO EA Vol 2
25	Demolish MOGAS Storage Tanks 491-499 <sup>4</sup>	Proposed	Industrial	DESC	WINDO EA Vol 1
26	Emergency Repair JPTS Filter Separators <sup>3</sup>	Proposed	Industrial	DESC	CATEX A2.3.10
27	API 570 Inspection and Groundwater Testing on Bulk Storage UG <sup>3</sup>	Proposed	Industrial	DESC	CATEX A2.3.10
28	Repair Bulk Storage Area JP-8 PH <sup>3</sup>	Proposed	Industrial	DESC	CATEX A2.3.10/12
29	2 New Valves on JP-8 Pipeline <sup>3</sup>	Proposed	Airfield	DESC	CATEX A2.3.10/12
30	API 653 JPTS Storage Tank Inspection <sup>3</sup>	Proposed	Industrial	DESC	CATEX A2.3.10
31	Upgrade JP-8 Hydrant Pit and Lids <sup>5</sup>	Proposed	Airfield and Open Space	DESC	WINDO EA Vol 2
32	Repair Land Based Discharge, Phase 1 <sup>6</sup>	Concurrent	Water	ENV	This project will be evaluated under a separate EA EIAP #02.53

Reference Number	Project Title	Action Category	Project Location	Funding Type	Approval Type/Title
33	Construct Land Based Discharged, Groundwater Monitoring Wells <sup>3</sup>	Proposed	Open Space	ENV	CATEX A2.3.26
34	GH Parking Prep 1- JP-7 Pipeline Closure <sup>3</sup>	Proposed	Aircraft O&M	GH	CATEX A2.3.11 Global Hawk EA
35	GH Parking Prep 2 - Pavement Repair/Apron Tiedowns <sup>3</sup>	Proposed	Aircraft O&M	GH	CATEX A2.3.11 Global Hawk EA
36	Fitness Center Lobby <sup>3</sup>	Proposed	Community	QOL	CATEX A2.3.8
37	Construct Running Path at O'Malley Field <sup>4</sup>	Proposed	Outdoor Recreation Areas	QOL	WINDO EA Vol 1
38	Landscape Valley Chapel <sup>3</sup>	Proposed	Community	QOL	CATEX A2.3.10
39	Construct LOX Storage Facility <sup>4</sup>	Proposed	Aircraft O&M and Industrial	O&M	WINDO EA Vol 1
40	Repair Airfield Taxiways and Aprons <sup>3</sup>	Proposed	Airfield	GWOT	CATEX A2.3.10 EIAP #04.12
41	Heritage Park <sup>5</sup>	Proposed	Open Space	QOL	WINDO EA Vol 2
42	Global Hawk LRE Cables <sup>5</sup>	Proposed	Open Space	MILCON	WINDO EA Vol 2 EIAP #04.11
43	Vernal Pool Restoration Phase 2 <sup>5</sup>	Proposed	Open Space	CEV	WINDO EA Vol 2

Source: 9 CES/CEC and 9 CES/CEV

Notes:

<sup>1</sup> Environmental approval for these projects was covered under previous environmental analysis; therefore, they will not be covered under this Environmental Assessment.

<sup>2</sup> Environmental analysis for these projects is currently ongoing; therefore, they will not be covered under this Environmental Assessment.

<sup>3</sup> This project qualifies for an Air Force categorical exclusion.

<sup>4</sup> This project is part of the Proposed Action and will be covered under this Environmental Assessment.

<sup>5</sup> This project involves wetland and/or floodplain issues and will be covered in WINDO EA, Volume 2.

<sup>6</sup> This project will be evaluated under a separate Environmental Assessment.

AAFES: Army & Air Force Exchange Service, AT/FP: Anti-Terrorism/Force Protection, CATEX: Categorical Exclusion, CBT: Computer Based Training, ENV: Environmental, O&M: Operations and Maintenance, FY: Fiscal Year, GH: Global Hawk, GWOT: Global War on Terrorism, LOX: Liquid Oxygen, MILCON: Military Construction, MOGAS: Motor Gasoline, QOL: Quality of Life, SRMC: Sustainment, Restoration, and Modernization for Contract, WINDO: Wing Infrastructure Development Outlook



***THIS PAGE INTENTIONALLY LEFT BLANK***

## **FY 2005 WINDO Projects**

***THIS PAGE INTENTIONALLY LEFT BLANK***

Table A-2 lists the projects programmed for implementation on Beale AFB in FY 2005.

**Table A-2. Projects Programmed for Fiscal Year 2005**

<b>Reference Number</b>	<b>Project Title</b>	<b>Action Category</b>	<b>Project Location</b>	<b>Funding Type</b>	<b>Approval Type/Title</b>
44	Add/Alter Plaza at Youth Center, Building 3340 <sup>1</sup>	Approved	Community	AT/FP	CATEX A2.3.11 Youth Center EA
45	Repair J Street Water Mains, Phase 1 <sup>1</sup>	Approved	Multiple Land Uses	ENV	Flightline and J Street Renovations EA EIAP #02.18
46	Storm Water Soils Holding Area <sup>1</sup>	Approved	Open Space	ENV	CATEX A2.3.7
47	Add/Alter Bldg 1225 for Global Hawk Aerospace Ground Equipment <sup>1</sup>	Approved	Aircraft O&M	MILCON	CATEX A2.3.11 Global Hawk EA EIAP #02.41
48	Upgrade Dock 2, Building 1075 <sup>1</sup>	Approved	Aircraft O&M	GH	CATEX A2.3.8 EIAP #04.08
49	Construct Flightline Centralized Parking South <sup>4</sup>	Proposed	Open Space	AT/FP	WINDO EA Vol 2
50	Construct Force Protection, 9 SFS <sup>2</sup>	Proposed	Industrial	AT/FP	CATEX A2.3.10
51	Repair Force Protection, 9 CES DCC, Building 2539 <sup>2</sup>	Proposed	Industrial	AT/FP	CATEX A2.3.10
52	Repair Dikes, 3 JP-8 Tanks <sup>2</sup>	Proposed	Industrial	DESC	CATEX A2.3.10/12
53	Clean and Internally Coat JP-8 Pipeline <sup>2</sup>	Proposed	Industrial	DESC	CATEX A2.3.10
54	Annual UST and Pipelines Tracer Integrity Testing <sup>2</sup>	Proposed	Industrial	DESC	CATEX A2.3.10
55	Repair A St. Gas Station, Building 2499 <sup>2</sup>	Proposed	Community	DESC	CATEX A2.3.10
56	Reroute Storm Water Bulk Fuels <sup>2</sup>	Proposed	Industrial	ENV	CATEX A2.3.10 EIAP #03.03
57	Erosion Control at Miller Lake <sup>4</sup>	Proposed	Water	ENV	WINDO EA Vol 2
58	Repair Lower Blackwelder Dam <sup>2</sup>	Proposed	Water	ENV	CATEX A2.3.11 WINDO EA Vol 2
59	Erosion Control at Upper Blackwelder Lake <sup>4</sup>	Proposed	Open Space	ENV	WINDO EA Vol 2
60	Fabrication Shop <sup>2</sup>	Proposed	Industrial	GH	CATEX A2.3.11 Global Hawk EA

Reference Number	Project Title	Action Category	Project Location	Funding Type	Approval Type/Title
61	Add/Alter Weapons Vault in Building 1023 <sup>2</sup>	Proposed	Aircraft O&M	GH	CATEX A2.3.8
62	Construct Joint 940 CES/SVS CBT Facility <sup>2</sup>	Proposed	Industrial	O&M	CATEX A2.3.11
63	Construct 940 ARW AGS SQ Maintenance and Administration Facility <sup>3</sup>	Proposed	Industrial	O&M	WINDO EA Vol 1
64	Construct 940 Security Force Squadron Mobility Equipment Storage Facility <sup>3</sup>	Proposed	Open Space	O&M	WINDO EA Vol 1 EIAP #03.30
65	Construct Shopette Gas Service Station and Car Wash <sup>3</sup>	Proposed	Open Space	AAFES	WINDO EA Vol 1
66	Construct 940 CES Entry Awning 940 CES Facility <sup>2</sup>	Proposed	Industrial	Tenants	CATEX A2.3.8
67	P2 Rock Crusher <sup>4</sup>	Proposed	Open Space	ENV	WINDO EA Vol. 2
68	Construct Gas Service Station, Auto Hobby Shop, and Car Wash <sup>4</sup>	Proposed	Open Space	AAFES	WINDO EA Vol 2

Source: 9 CES/CEC and 9 CES/CEV

Notes:

<sup>1</sup> Environmental approval for these projects was covered under previous environmental analysis; therefore, they will not be covered under this Environmental Assessment.

<sup>2</sup> This project qualifies for an Air Force categorical exclusion.

<sup>3</sup> This project is part of the Proposed Action and will be covered under this Environmental Assessment.

<sup>4</sup> This project involves wetland and/or floodplain issues and will be covered in WINDO EA, Volume 2.

AAFES: Army & Air Force Exchange Service, AT/FP: Anti-Terrorism/Force Protection, CATEX: Categorical Exclusion, CBT: Computer Based Training, ENV: Environmental, O&M: Operations and Maintenance, FY: Fiscal Year, GH: Global Hawk, GWOT: Global War on Terrorism, LOX: Liquid Oxygen, MILCON: Military Construction, MOGAS: Motor Gasoline, QOL: Quality of Life, SRMC: Sustainment, Restoration, and Modernization for Contract, WINDO: Wing Infrastructure Development Outlook

## **FY 2006 WINDO Projects**



***THIS PAGE INTENTIONALLY LEFT BLANK***

Table A-3 lists the projects programmed for implementation on Beale AFB in FY 2006.

**Table A-3. Projects Programmed for Fiscal Year 2006**

<b>Reference Number</b>	<b>Project Title</b>	<b>Action Category</b>	<b>Project Location</b>	<b>Funding Type</b>	<b>Approval Type/Title</b>
69	Repair Water Mains J Street, Phase II <sup>1</sup>	Approved	Multiple Land Uses	ENV	Flightline and J Street Renovations EA
70	Child Development Center <sup>1</sup>	Approved	Industrial	MILCON	Global Hawk EA
71	Construct POL Office Building, Bulk Fuels Storage Area <sup>3</sup>	Proposed	Industrial	GWOT	CATEX A2.3.10
72	Maintain Vassar Lake Gate House, Bldg. 3296 <sup>2</sup>	Concurrent	Open Space	AT/FP	AT/FP Upgrades EA
73	Repair Force Protection Air Traffic Control Tower <sup>3</sup>	Proposed	Aircraft O&M	AT/FP	CATEX A2.3.8
74	Repair Force Protection at AFCOMAC School <sup>3</sup>	Proposed	Administrative	AT/FP	CATEX A2.3.10
75	Install Duress Alarms WG/CC & WG/CV Quarters <sup>3</sup>	Proposed	Housing	AT/FP	CATEX A2.3.8
76	Repair Force Protection at Drinking Water Treatment Plant <sup>3</sup>	Proposed	Open Space	AT/FP	CATEX A2.3.10
77	Construct Force Protection, Flightline Elevated H <sub>2</sub> O Storage Tank <sup>3</sup>	Proposed	Open Space	AT/FP	CATEX A2.3.11
78	Repair Force Protection, Recce Point Club <sup>5</sup>	Proposed	Community	AT/FP	WINDO EA Vol 2
79	Construct Force Protection at Valley Chapel, Phase 2 <sup>3</sup>	Proposed	Community	AT/FP	CATEX A2.3.10
80	Construct Dumpster Blast Mitigation, Main Base <sup>3</sup>	Proposed	Multiple Land Uses	AT/FP	CATEX A2.3.10
81	Construct Dumpster Blast Mitigation, Flightline <sup>3</sup>	Proposed	Aircraft O&M	AT/FP	CATEX A2.3.10

Reference Number	Project Title	Action Category	Project Location	Funding Type	Approval Type/Title
82	Demolish NAVAID Shop, Building 502 <sup>3</sup>	Proposed	Industrial	O&M	CATEX A2.3.10
83	Demolish NCO Club, Building 5800 <sup>4</sup>	Proposed	Community	O&M	WINDO EA Vol 1
84	Slurry JP-7 Test Cell Piping & JP4 Piping at Control Tower <sup>3</sup>	Proposed	Airfield	DESC	CATEX A2.3.12
85	Demolish/Replace Security Lighting POL <sup>3</sup>	Proposed	Industrial	DESC	CATEX A2.3.12
86	Washracks Storm Water Improvement <sup>3</sup>	Proposed	Various	ENV	CATEX A2.3.8
87	Construct 2 Bay Pre-flight Hangar <sup>4</sup>	Proposed	Aircraft O&M	MILCON	WINDO EA Vol 1
88	Construct 940 ARW Consolidated Storage Facility <sup>4</sup>	Proposed	Open Space	O&M	WINDO EA Vol 1

Source: 9 CES/CEC and 9 CES/CEV

Notes:

<sup>1</sup> Environmental approval for these projects was covered under previous environmental analysis; therefore, they will not be covered under this Environmental Assessment.

<sup>2</sup> Environmental analysis for these projects is currently ongoing; therefore, they will not be covered under this Environmental Assessment.

<sup>3</sup> This project qualifies for an Air Force categorical exclusion.

<sup>4</sup> This project is part of the Proposed Action and will be covered under this Environmental Assessment.

<sup>5</sup> This project involves wetland and/or floodplain issues and will be covered in WINDO EA, Volume 2.

AAFES: Army & Air Force Exchange Service, AT/FP: Anti-Terrorism/Force Protection, CATEX: Categorical Exclusion, CBT: Computer Based Training, ENV: Environmental, O&M: Operations and Maintenance, FY: Fiscal Year, GH: Global Hawk, GWOT: Global War on Terrorism, LOX: Liquid Oxygen, MILCON: Military Construction, MOGAS: Motor Gasoline, QOL: Quality of Life, SRMC: Sustainment, Restoration, and Modernization for Contract, WINDO: Wing Infrastructure Development Outlook

**Appendix B**  
**Clean Air Act General Conformity Analysis Emissions Calculations**



## Emissions Estimates for WINDO Implementation Plan Projects at Beale AFB, CA

<b>Summary</b>	Summarizes total emissions by calendar year. (this worksheet) Pages B-1, B-2, and B-3
<b>Combustion</b>	Estimates emissions from non-road equipment exhaust as well as painting. (one worksheet for each calendar year) Pages B-4, B-5, B-6, and B-7 for 2005, pages B-12, B-13, B-14, and B-15 for 2006, and pages B-20, B-21, B-22, and B-23 for 2007
<b>Fugitive</b>	Estimates fine particulate emissions from earthmoving, vehicle traffic, and windblown dust (one worksheet for each calendar year) Pages B-8, B-9, B-10 for 2005, pages B-16, B-17, and B-18 for 2006, and pages B-24, B-25, and B-26 for 2007
<b>Grading</b>	Estimates the number of days of site preparation, to be used for estimating heavy equipment exhaust and earthmoving dust emissions (one worksheet for each calendar year) Page B-11 for 2005, page B-19 for 2006, and page B-27 for 2007



		<b>NOx (ton)</b>	<b>VOC (ton)</b>	<b>CO (ton)</b>	<b>SO2 (ton)</b>	<b>PM10 (ton)</b>
<b>CY2005</b>	Combustion	7.13	1.12	8.28	0.21	0.24
	Fugitive Dust					24.91
	TOTAL CY2005	7.13	1.12	8.28	0.21	25.15

		<b>NOx (ton)</b>	<b>VOC (ton)</b>	<b>CO (ton)</b>	<b>SO2 (ton)</b>	<b>PM10 (ton)</b>
<b>CY2006</b>	Combustion	5.12	0.89	6.43	0.13	0.16
	Fugitive Dust					40.46
	TOTAL CY2006	5.12	0.89	6.43	0.13	40.63

		<b>NOx (ton)</b>	<b>VOC (ton)</b>	<b>CO (ton)</b>	<b>SO2 (ton)</b>	<b>PM10 (ton)</b>
<b>CY2007</b>	Combustion	2.02	0.34	2.91	0.04	0.06
	Fugitive Dust					13.81
	TOTAL CY2007	2.02	0.34	2.91	0.04	13.87

### General Conformity Regional Significance Thresholds (10% of regional budget)

Since future year budgets were not readily available, actual 1999 air emissions inventories for the counties were used as an approximation of the regional inventory. Because the Proposed Action is several orders of magnitude below significance, the conclusion would be the same, regardless of whether future year budget data set were used.

### Sacramento Valley Intrastate AQCR

Year	Point and Area Sources Combined				
	NOx (tpy)	VOC (tpy)	CO (tpy)	SO2 (tpy)	PM10 (tpy)
1999	113,974	116,668	768,833	12,778	108,812

Source: USEPA-AirData NET Tier Report (<http://www.epa.gov/air/data/states/calist.html?co~CA~>). Site visited on 5/3/05

### Determination Significance (Significance Threshold = 10%)

	Point and Area Sources Combined				
	NOx (tpy)	VOC (tpy)	CO (tpy)	SO2 (tpy)	PM10 (tpy)
Minimum -1999	113,974	116,668	768,833	12,778	108,812
2005 Emissions	7.13	1.12	8.28	0.21	25.15
Proposed Action %	0.0063%	0.0010%	0.0011%	0.0016%	0.0231%

	Point and Area Sources Combined				
	NOx (tpy)	VOC (tpy)	CO (tpy)	SO2 (tpy)	PM10 (tpy)
Minimum -1999	113,974	116,668	768,833	12,778	108,812
2006 Emissions	5.12	0.89	6.43	0.13	40.63
Proposed Action %	0.0045%	0.0008%	0.0008%	0.0010%	0.0373%

	Point and Area Sources Combined				
	NOx (tpy)	VOC (tpy)	CO (tpy)	SO2 (tpy)	PM10 (tpy)
Minimum -1999	113,974	116,668	768,833	12,778	108,812
2007 Emissions	2.02	0.34	2.91	0.04	13.87
Proposed Action %	0.0018%	0.0003%	0.0004%	0.0003%	0.0127%

## WINDO Implementation Plan Projects at Beale AFB, CA

### Construction Combustion Emissions for CY 2005

Combustion Emissions of VOC, NOx, SO2, CO and PM10 Due to Construction

Includes :

1	100% of Construct Heritage Park (New Building Construction)	3,650 ft <sup>2</sup>	0.08	acres
2	100% of Construct heritage Park (Utility Installation)	20,220 ft <sup>2</sup>	0.46	acres
3	100% of Construct Heritage Park (New Pavements)	70,470 ft <sup>2</sup>	1.62	acres
4	100% of Construct Heritage Park (Clearing, Grubbing, and Grading)	252,560 ft <sup>2</sup>	5.80	acres
5	100% of Construct Visitor Center Main Gate	1,000 ft <sup>2</sup>	0.02	acres
6	100% of Upgrade JP-8 Hydrant Outlet Pits and Lids	475 ft <sup>2</sup>	0.01	acres
7	100% of Install Global Hawk LRE Cables	1,388 ft <sup>2</sup>	0.03	acres
8	64% of Conduct Vernal Pool Restoration Phase 2	524,462 ft <sup>2</sup>	12.04	acres

NOTE: The projects listed above are FY04 funded projects. It is assumed that these projects will be completed in CY05.

Total Building Construction Area:	5,125 ft <sup>2</sup>	(1, 5, and 6)
Total Demolished Area:	0 ft <sup>2</sup>	None
Total Paved Area:	70,470 ft <sup>2</sup>	(3)
Total Disturbed Area:	874,225 ft <sup>2</sup>	(1-8)
Construction Duration:	1.0 year(s)	
Annual Construction Activity:	230 days/yr	(assume 230 days/year unless project-specific data known)

#### Summary of Input Parameters

	Total Area (ft <sup>2</sup> )	Total Area (acres)	Total Days	
Grading:	874,225	20.07	4	(from "Grading" worksheet)
Paving:	70,470	1.62	8	
Demolition:	0	0.00	0	
Building Construction:	5,125	0.12	198	
Architectural Coating	5,125	0.12	20	(per the SMAQMD "Air Quality of Thresholds of Significance", 1994 version)

NOTE: The 'Total Days' estimate for paving is calculated by dividing the total number of acres by 0.21 acres/day, which is a factor derived from the 2005 MEANS Heavy Construction Cost Data, 19th Edition, for 'Asphaltic Concrete Pavement, Lots and Driveways - 6" stone base', which provides an estimate of square feet paved per day. There is also an estimate for 'Plain Cement Concrete Pavement', however the estimate for asphalt is used because it is more conservative. The 'Total Days' estimate for demolition is calculated by dividing the total number of acres by 0.02 acres/day, which is a factor also derived from the 2005 MEANS reference. This is calculated by averaging the demolition estimates from 'Building Demolition - Small Buildings, Concrete', assuming a height of 30 feet for a two-story building; from 'Building Footings and Foundations Demolition - 6" Thick, Plain Concrete'; and from 'Demolish, Remove Pavement and Curb - Concrete to 6" thick, rod reinforced'.

The 'Total Days' estimate for building construction is assumed to be the number of remaining construction days as a conservative estimate.

## Emission Factors Used for Construction Equipment

Reference: Guide to Air Quality Assessment, SMAQMD, 2004

Emission factors are taken from Table 3-2 for CY 2005. Assumptions regarding the type and number of equipment are from Table 3-1 unless otherwise noted.

### Grading

Equipment	No. Req <sup>d</sup> . <sup>a</sup> per 10 acres	NO <sub>x</sub> (lb/day)	VOC <sup>b</sup> (lb/day)	CO (lb/day)	SO <sub>2</sub> <sup>c</sup>	PM <sub>10</sub> (lb/day)
Bulldozer	1	29.40	3.66	25.09	0.59	1.17
Motor Grader	1	10.22	1.76	14.98	0.20	0.28
Water Truck	1	20.89	3.60	30.62	0.42	0.58
Total per 10 acres of activity	3	60.51	9.02	70.69	1.21	2.03

### Paving

Equipment	No. Req <sup>d</sup> . <sup>a</sup> per 10 acres	NO <sub>x</sub> (lb/day)	VOC <sup>b</sup> (lb/day)	CO (lb/day)	SO <sub>2</sub> <sup>c</sup>	PM <sub>10</sub> (lb/day)
Paver	1	7.93	1.37	11.62	0.16	0.22
Roller	1	5.01	0.86	7.34	0.10	0.14
Total per 10 acres of activity	2	12.94	2.23	18.96	0.26	0.36

### Demolition

Equipment	No. Req <sup>d</sup> . <sup>a</sup> per 10 acres	NO <sub>x</sub> (lb/day)	VOC <sup>b</sup> (lb/day)	CO (lb/day)	SO <sub>2</sub> <sup>c</sup>	PM <sub>10</sub> (lb/day)
Loader	1	7.86	1.35	11.52	0.16	0.22
Haul Truck	1	20.89	3.60	30.62	0.42	0.58
Total per 10 acres of activity	2	28.75	4.95	42.14	0.58	0.80

### Building Construction

Equipment <sup>d</sup>	No. Req <sup>d</sup> . <sup>a</sup> per 10 acres	NO <sub>x</sub> (lb/day)	VOC <sup>b</sup> (lb/day)	CO (lb/day)	SO <sub>2</sub> <sup>c</sup>	PM <sub>10</sub> (lb/day)
<b>Stationary</b>						
Generator Set	1	11.83	1.47	10.09	0.24	0.47
Industrial Saw	1	17.02	2.12	14.52	0.34	0.68
Welder	1	4.48	0.56	3.83	0.09	0.18
<b>Mobile (non-road)</b>						
Truck	1	20.89	3.60	30.62	0.84	0.58
Forklift	1	4.57	0.79	6.70	0.18	0.13
Crane	1	8.37	1.44	12.27	0.33	0.23
Total per 10 acres of activity	6	67.16	9.98	78.03	2.02	2.27

Note: Footnotes for tables are on following page

### Architectural Coatings

Equipment	No. Req <sup>d</sup> . <sup>a</sup> per 10 acres	NOx (lb/day)	VOC <sup>b</sup> (lb/day)	CO (lb/day)	SO <sub>2</sub> <sup>c</sup>	PM <sub>10</sub> (lb/day)
Air Compressor	1	6.83	0.85	5.82	0.14	0.27
Total per 10 acres of activity	1	6.83	0.85	5.82	0.14	0.27

- a) The SMAQMD 2004 guidance suggests a default equipment fleet for each activity, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.
- b) The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC.
- c) The SMAQMD 2004 reference does not provide SO<sub>2</sub> emission factors. For this worksheet, SO<sub>2</sub> emissions have been estimated based on approximate fuel use rate for diesel equipment and the assumption of 500 ppm sulfur diesel fuel. For the average of the equipment fleet, the resulting SO<sub>2</sub> factor was found to be approximately 0.04 times the NOx emission factor for the mobile equipment (based upon 2002 USAF IERA "Air Emissions Inventory Guidance") and 0.02 times the NOx emission factor for all other equipment (based on AP-42, Table 3.4-1)
- d) Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

### PROJECT-SPECIFIC EMISSION FACTOR SUMMARY

Source	Equipment Multiplier*	SMAQMD Emission Factors (lb/day)				
		NOx	VOC	CO	SO <sub>2</sub> **	PM <sub>10</sub>
Grading Equipment	3	181.53	27.06	212.07	3.63	6.09
Paving Equipment	1	12.94	2.23	18.96	0.26	0.36
Demolition Equipment	1	28.75	4.95	42.14	0.58	0.80
Building Construction	1	67.16	9.98	78.03	2.02	2.27
Air Compressor for Architectural Coating	1	6.83	0.85	5.82	0.14	0.27
Architectural Coating**			5.83			

\*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project

\*\*Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994

### Annual Emissions by Activity (lbs/yr)

	NOx	VOC	CO	SO2	PM10
Grading Equipment	726.1	108.2	848.3	14.5	24.4
Paving	103.5	17.8	151.7	2.1	2.9
Demolition	0.0	0.0	0.0	0.0	0.0
Building Construction	13297.7	1976.0	15449.9	399.9	449.5
Architectural Coatings	136.6	133.7	116.4	2.7	5.4
<b>Total Emissions (lbs/yr):</b>	<b>14263.9</b>	<b>2235.8</b>	<b>16566.3</b>	<b>419.2</b>	<b>482.1</b>

### Results: Daily and Annual Emission Rates

	NOx	VOC	CO	SO2	PM10
Emissions, average lbs/day	14263.92	2235.81	16566.30	419.25	482.10
Emissions, tons/yr	7.13	1.12	8.28	0.21	0.24



## WINDO Implementation Plan Projects at Beale AFB, CA

### Construction Fugitive Dust Emissions for CY 2005

Calculation of PM10 Emissions Due to Site Preparation (Uncontrolled).

#### User Input Parameters / Assumptions

Acres graded per year:	20.07	acres/yr	(From "CY05 Combustion" worksheet)
Grading days/yr:	3.74	days/yr	(From "CY05 Grading" worksheet)
Exposed days/yr:	90	assumed days/yr	graded area is exposed
Grading Hours/day:	8	hr/day	
Soil piles area fraction:	0.10	(assumed fraction of site area covered by soil piles)	
Soil percent silt, s:	8.5	%	(mean silt content; expected range: 0.56 to 23, AP-42 Table 13.2.2-1)
Soil percent moisture, M:	50	%	(NOAA 2005 <a href="http://www.cpc.noaa.gov/products/soilmst/w.html">http://www.cpc.noaa.gov/products/soilmst/w.html</a> )
Annual rainfall days, p:	60	days/yr	rainfall exceeds 0.01 inch/day (AP-42 Fig 13.2.2-1)
Wind speed > 12 mph %, I:	21.5	%	Ave. wind speed at Yuba City, CA ( <a href="http://www.epa.gov/ttn/naaqs/ozone/areas/wind.htm">http://www.epa.gov/ttn/naaqs/ozone/areas/wind.htm</a> )
Fraction of TSP, J:	0.5	per California Environmental Quality Act (CEQA) Air Quality Handbook, SCAQMD, 1993, p. A9-99	
Mean vehicle speed, S:	5	mi/hr	(On-site)
Dozer path width:	8	ft	
Qty construction vehicles:	9.00	vehicles	(From "CY05 Grading" worksheet)
On-site VMT/vehicle/day:	5	mi/veh/day	(Excluding bulldozer VMT during grading)
PM10 Adjustment Factor k	1.5	lb/VMT	(AP-42 Table 13.2.2-2 12/03 for PM10 for unpaved roads)
PM10 Adjustment Factor a	0.9	(dimensionless)	(AP-42 Table 13.2.2-2 12/03 for PM10 for unpaved roads)
PM10 Adjustment Factor b	0.45	(dimensionless)	(AP-42 Table 13.2.2-2 12/03 for PM10 for unpaved roads)
Mean Vehicle Weight W	40	tons	assumed for aggregate trucks

TSP - Total Suspended Particulate

VMT - Vehicle Miles Traveled

## Emissions Due to Soil Disturbance Activities

### Operation Parameters (Calculated from User Inputs)

Grading duration per acre	1.5 hr/acre	
Bulldozer mileage per acre	1 VMT/acre	(Miles traveled by bulldozer during grading)
Construction VMT per day	45 VMT/day	
Construction VMT per acre	8.4 VMT/acre	(Travel on unpaved surfaces within site)

### Equations Used (Corrected for PM10)

Operation	Empirical Equation	Units	AP-42 Section (5th Edition)
Bulldozing	$0.75(s^{1.5})/(M^{1.4})$	lbs/hr	Table 11.9-1, Overburden
Grading	$(0.60)(0.051)s^{2.0}$	lbs/VMT	Table 11.9-1,
Vehicle Traffic (unpaved roads)	$[(k(s/12)^a (W/3)^b)] [(365-P)/365]$	lbs/VMT	Section 13.2.2

Source: Compilation of Air Pollutant Emission Factors, Vol. I, USEPA AP-42, Section 11.9 dated 10/98 and Section 13.2 dated 12/03

### Calculation of PM10 Emission Factors for Each Operation

Operation	Emission Factor (mass/ unit)	Operation Parameter	Emission Factor (lbs/ acre)
Bulldozing	0.08 lbs/hr	1.5 hr/acre	0.10 lbs/acre
Grading	0.77 lbs/VMT	1 VMT/acre	0.80 lbs/acre
Vehicle Traffic (unpaved roads)	2.95 lbs/VMT	8.4 VMT/acre	24.80 lbs/acre

### Emissions Due to Wind Erosion of Soil Piles and Exposed Graded Surface

Reference: California Environmental Quality Act (CEQA) Air Quality Handbook, SCAQMD, 1993.

Soil Piles EF =  $1.7(s/1.5)[(365 - p)/235](I/15)(J) = (s)(365 - p)(I)(J)/(3110.2941)$ , p. A9-99.

Soil Piles EF = 9 lbs/day/acre covered by soil piles

Consider soil piles area fraction so that EF applies to graded area

Soil piles area fraction: 0.10 (Fraction of site area covered by soil piles)

Soil Piles EF = 0.9 lbs/day/acres graded

Graded Surface EF = 26.4 lbs/day/acre (recommended in CEQA Manual, p. A9-93).

### Calculation of Annual PM10 Emissions

Source	Emission Factor	Graded Acres/yr	Exposed days/yr	Emissions lbs/yr	Emissions tons/yr
Bulldozing	0.10 lbs/acre	20.07	NA	2	0.00
Grading	0.80 lbs/acre	20.07	NA	16	0.01
Vehicle Traffic	24.80 lbs/acre	20.07	NA	498	0.25
Erosion of Soil Piles	0.90 lbs/acre/day	20.07	90	1,626	0.81
Erosion of Graded Surface	26.40 lbs/acre/day	20.07	90	47,685	23.84
<b>TOTAL</b>				<b>49,826</b>	<b>24.91</b>

Soil Disturbance EF: 25.70 lbs/acre

Wind Erosion EF: 27.3 lbs/acre/day

Back calculate to get EF: 664.44 lbs/acre/grading day

## WINDO Implementation Plan Projects at Beale AFB, CA

### Construction (Grading) Schedule for CY 2005

Estimate of time required to grade a specified area.

#### Input Parameters

Construction area: 20.07 acres/yr (from "CY05 Combustion" Worksheet)  
 Qty Equipment: 9.00 (calculated based on 3 pieces of equipment for every 10 acres)

#### Assumptions.

Terrain is mostly flat.

An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.

200 hp bulldozers are used for site clearing.

300 hp bulldozers are used for stripping, excavation, and backfill.

Vibratory drum rollers are used for compacting.

Stripping, Excavation, Backfill and Compaction require an average of two passes each.

Excavation and Backfill are assumed to involve only half of the site.

#### Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 19th Ed., R. S. Means, 2005.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day)	equip-days per acre	Acres/yr (project- specific)	Equip-days per year
2230 200 0550	Site Clearing	Dozer & rake, medium brush	8	acre/day	8	0.13	20.07	2.51
2230 500 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	20.07	9.81
2315 432 5220	Excavation	Bulk, open site, common earth, 150' haul	800	cu. yd/day	0.99	1.01	10.03	10.12
2315 120 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	10.03	4.15
2315 310 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	2,300	cu. yd/day	2.85	0.35	20.07	7.04
TOTAL								33.63

#### Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 33.63  
 Qty Equipment: 9.00  
 Grading days/yr: 3.74

## WINDO Implementation Plan Projects at Beale AFB, CA

### Construction Combustion Emissions for CY 2006

Combustion Emissions of VOC, NOx, SO2, CO and PM10 Due to Construction

Includes:

1 100% of Demolish P2 Rock Crusher Project Area	95,396 ft <sup>2</sup>	2.19	acres
2 100% of Construct Flightline Centralized Parking South Access Road	36,000 ft <sup>2</sup>	0.83	acres
3 100% of Construct Gas Service Station, Auto Hobby Shop, and Car Wash	9,552 ft <sup>2</sup>	0.22	acres
4 100% of Construct Gas Service Station, Auto Hobby Shop, and Car Wash Parking Lot	68,825 ft <sup>2</sup>	1.58	acres
5 100% of Repair Erosion at Miller Lake	131,551 ft <sup>2</sup>	3.02	acres
6 100% of Repair Erosion at Upper Blackwelder Lake	544,064 ft <sup>2</sup>	12.49	acres
7 100% of Construct Spillways at Upper Blackwelder Lake	3,000 ft <sup>2</sup>	0.07	acres
8 100% of Repair Erosion at Lower Blackwelder Lake	377,230 ft <sup>2</sup>	8.66	acres
9 18% of Conduct Vernal Pool Restoration Phase 2	152,460 ft <sup>2</sup>	3.50	acres

Note: The projects listed above are FY05 funded projects. It is assumed that these projects will be completed sometime in CY06.

Total Building Construction Area:	12,552 ft <sup>2</sup>	(3 and 7)
Total Demolished Area:	95,396 ft <sup>2</sup>	(1)
Total Paved Area:	104,825 ft <sup>2</sup>	(2 and 4)
Total Disturbed Area:	1,418,078 ft <sup>2</sup>	(1-9)
Construction Duration:	1.0 year(s)	
Annual Construction Activity:	230 days/yr	(assume 230 days/year unless project-specific data known)

#### Summary of Input Parameters

	Total Area (ft <sup>2</sup> )	Total Area (acres)	Total Days	
Grading:	1,418,078	32.55	5	(from "Grading" worksheet)
Paving:	104,825	2.41	12	
Demolition:	95,396	2.19	110	
Building Construction:	12,552	0.29	83	
Architectural Coating	12,552	0.29	20	(per 1994 SMAQMD "Air Quality of Thresholds of Significance")

NOTE: The 'Total Days' estimate for paving is calculated by dividing the total number of acres by 0.21 acres/day, which is a factor derived from the 2005 MEANS Heavy Construction Cost Data, 19th Edition, for 'Asphaltic Concrete Pavement, Lots and Driveways - 6" stone base', which provides an estimate of square feet paved per day. There is also an estimate for 'Plain Cement Concrete Pavement', however the estimate for asphalt is used because it is more conservative. The 'Total Days' estimate for demolition is calculated by dividing the total number of acres by 0.02 acres/day, which is a factor also derived from the 2005 MEANS reference. This is calculated by averaging the demolition estimates from 'Building Demolition - Small Buildings, Concrete', assuming a height of 30 feet for a two-story building; from 'Building Footings and Foundations Demolition - 6" Thick, Plain Concrete'; and from 'Demolish, Remove Pavement and Curb - Concrete to 6" thick, rod reinforced'.

The 'Total Days' estimate for building construction is assumed to be the number of remaining construction days as a conservative estimate.

## Emission Factors Used for Construction Equipment

Reference: Guide to Air Quality Assessment, SMAQMD, 2004

Emission factors are taken from Table 3-2 for CY 2005. Assumptions regarding the type and number of equipment are from Table 3-1 unless otherwise noted.

### Grading

Equipment	No. Req'd. <sup>a</sup> per 10 acres	NOx (lb/day)	VOC <sup>b</sup> (lb/day)	CO (lb/day)	SO <sub>2</sub> <sup>c</sup>	PM <sub>10</sub> (lb/day)
Bulldozer	1	29.40	3.66	25.09	0.59	1.17
Motor Grader	1	10.22	1.76	14.98	0.20	0.28
Water Truck	1	20.89	3.60	30.62	0.42	0.58
Total per 10 acres of activity	3	60.51	9.02	70.69	1.21	2.03

### Paving

Equipment	No. Req'd. <sup>a</sup> per 10 acres	NOx (lb/day)	VOC <sup>b</sup> (lb/day)	CO (lb/day)	SO <sub>2</sub> <sup>c</sup>	PM <sub>10</sub> (lb/day)
Paver	1	7.93	1.37	11.62	0.16	0.22
Roller	1	5.01	0.86	7.34	0.10	0.14
Total per 10 acres of activity	2	12.94	2.23	18.96	0.26	0.36

### Demolition

Equipment	No. Req'd. <sup>a</sup> per 10 acres	NOx (lb/day)	VOC <sup>b</sup> (lb/day)	CO (lb/day)	SO <sub>2</sub> <sup>c</sup>	PM <sub>10</sub> (lb/day)
Loader	1	7.86	1.35	11.52	0.16	0.22
Haul Truck	1	20.89	3.60	30.62	0.42	0.58
Total per 10 acres of activity	2	28.75	4.95	42.14	0.58	0.80

### Building Construction

Equipment <sup>d</sup>	No. Req'd. <sup>a</sup> per 10 acres	NOx (lb/day)	VOC <sup>b</sup> (lb/day)	CO (lb/day)	SO <sub>2</sub> <sup>c</sup>	PM <sub>10</sub> (lb/day)
<b>Stationary</b>						
Generator Set	1	11.83	1.47	10.09	0.24	0.47
Industrial Saw	1	17.02	2.12	14.52	0.34	0.68
Welder	1	4.48	0.56	3.83	0.09	0.18
<b>Mobile (non-road)</b>						
Truck	1	20.89	3.60	30.62	0.84	0.58
Forklift	1	4.57	0.79	6.70	0.18	0.13
Crane	1	8.37	1.44	12.27	0.33	0.23
Total per 10 acres of activity	6	67.16	9.98	78.03	2.02	2.27

Note: Footnotes for tables are on following page

### Architectural Coatings

Equipment	No. Reqd. <sup>a</sup> per 10 acres	NOx (lb/day)	VOC <sup>b</sup> (lb/day)	CO (lb/day)	SO <sub>2</sub> <sup>c</sup>	PM <sub>10</sub> (lb/day)
Air Compressor	1	6.83	0.85	5.82	0.14	0.27
Total per 10 acres of activity	1	6.83	0.85	5.82	0.14	0.27

- a) The SMAQMD 2004 guidance suggests a default equipment fleet for each activity, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.
- b) The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC.
- c) The SMAQMD 2004 reference does not provide SO<sub>2</sub> emission factors. For this worksheet, SO<sub>2</sub> emissions have been estimated based on approximate fuel use rate for diesel equipment and the assumption of 500 ppm sulfur diesel fuel. For the average of the equipment fleet, the resulting SO<sub>2</sub> factor was found to be approximately 0.04 times the NOx emission factor for the mobile equipment (based upon 2002 USAF IERA "Air Emissions Inventory Guidance") and 0.02 times the NOx emission factor for all other equipment (based on AP-42, Table 3.4-1)
- d) Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

### PROJECT-SPECIFIC EMISSION FACTOR SUMMARY

Source	Equipment Multiplier*	SMAQMD Emission Factors (lb/day)				
		NOx	VOC	CO	SO <sub>2</sub> **	PM <sub>10</sub>
Grading Equipment	4	242.04	36.08	282.76	4.84	8.12
Paving Equipment	1	12.94	2.23	18.96	0.26	0.36
Demolition Equipment	1	28.75	4.95	42.14	0.58	0.80
Building Construction	1	67.16	9.98	78.03	2.02	2.27
Air Compressor for Architectural Coating	1	6.83	0.85	5.82	0.14	0.27
Architectural Coating**			9.13			

\*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project

\*\*Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994



### Annual Emissions by Activity (lbs/yr)

	NOx	VOC	CO	SO2	PM10
Grading Equipment	1210.2	180.4	1413.8	24.2	40.6
Paving	155.3	26.8	227.5	3.1	4.3
Demolition	3162.5	544.5	4635.4	63.3	88.0
Building Construction	5574.3	828.3	6476.5	167.6	188.4
Architectural Coatings	136.6	199.6	116.4	2.7	5.4
<b>Total Emissions (lbs/yr):</b>	<b>10238.9</b>	<b>1779.6</b>	<b>12869.6</b>	<b>260.9</b>	<b>326.7</b>

### Results: Daily and Annual Emission Rates

	NOx	VOC	CO	SO2	PM10
Emissions, average lbs/day	10238.86	1779.62	12869.61	260.94	326.73
Emissions, tons/yr	5.12	0.89	6.43	0.13	0.16

## WINDO Implementation Plan Projects at Beale AFB, CA

### Construction Fugitive Dust Emissions for CY 2006

Note: The P2 rock crushing project is expected to require the crushing of 20,000 cu. yd., or 540,000 cu. ft. (cf) of concrete debris. Based on a density of 160 lb/cf, approximately 43,343 tons of concrete are to be crushed. Using a PM10 emission factor of 0.0024 lb/ton for tertiary crushing from AP-42 Table 11.19.2-2, approximately 104 pounds, or 0.05 tons, of PM10 will be emitted during the P2 rock crushing project.

Calculation of PM10 Emissions Due to Site Preparation (Uncontrolled).

#### User Input Parameters / Assumptions

Acres graded per year:	32.55	acres/yr	(From "CY06 Combustion" worksheet)
Grading days/yr:	4.55	days/yr	(From "CY06 Grading" worksheet)
Exposed days/yr:	90	assumed days/yr	graded area is exposed
Grading Hours/day:	8	hr/day	
Soil piles area fraction:	0.10	(assumed fraction of site area covered by soil piles)	
Soil percent silt, s:	8.5	%	(mean silt content; expected range: 0.56 to 23, AP-42 Table 13.2.2-1)
Soil percent moisture, M:	50	%	(NOAA 2005 <a href="http://www.cpc.noaa.gov/products/soilmst/w.html">http://www.cpc.noaa.gov/products/soilmst/w.html</a> )
Annual rainfall days, p:	60	days/yr	rainfall exceeds 0.01 inch/day (AP-42 Fig 13.2.2-1)
Wind speed > 12 mph %, I:	21.5	%	Ave. wind speed at Yuba City, CA ( <a href="http://www.epa.gov/ttn/naaqs/ozone/areas/wind.htm">http://www.epa.gov/ttn/naaqs/ozone/areas/wind.htm</a> )
Fraction of TSP, J:	0.5	per California Environmental Quality Act (CEQA) Air Quality Handbook, SCAQMD, 1993, p. A9-99	
Mean vehicle speed, S:	5	mi/hr	(On-site)
Dozer path width:	8	ft	
Qty construction vehicles:	12.00	vehicles	(From "CY06 Grading" worksheet)
On-site VMT/vehicle/day:	5	mi/veh/day	(Excluding bulldozer VMT during grading)
PM10 Adjustment Factor k	1.5	lb/VMT	(AP-42 Table 13.2.2-2 12/03 for PM10 for unpaved roads)
PM10 Adjustment Factor a	0.9	(dimensionless)	(AP-42 Table 13.2.2-2 12/03 for PM10 for unpaved roads)
PM10 Adjustment Factor b	0.45	(dimensionless)	(AP-42 Table 13.2.2-2 12/03 for PM10 for unpaved roads)
Mean Vehicle Weight W	40	tons	assumed for aggregate trucks

TSP - Total Suspended Particulate

VMT - Vehicle Miles Traveled

## Emissions Due to Soil Disturbance Activities

### Operation Parameters (Calculated from User Inputs)

Grading duration per acre	1.1 hr/acre	
Bulldozer mileage per acre	1 VMT/acre	(Miles traveled by bulldozer during grading)
Construction VMT per day	60 VMT/day	
Construction VMT per acre	8.4 VMT/acre	(Travel on unpaved surfaces within site)

### Equations Used (Corrected for PM10)

Operation	Empirical Equation	Units	AP-42 Section (5th Edition)
Bulldozing	$0.75(s^{1.5})/(M^{1.4})$	lbs/hr	Table 11.9-1, Overburden
Grading	$(0.60)(0.051)s^{2.0}$	lbs/VMT	Table 11.9-1,
Vehicle Traffic (unpaved roads)	$[(k(s/12)^a (W/3)^b)] [(365-P)/365]$	lbs/VMT	Section 13.2.2

Source: Compilation of Air Pollutant Emission Factors, Vol. I, USEPA AP-42, Section 11.9 dated 10/98 and Section 13.2 dated 12/03

### Calculation of PM10 Emission Factors for Each Operation

Operation	Emission Factor (mass/ unit)	Operation Parameter	Emission Factor (lbs/ acre)
Bulldozing	0.08 lbs/hr	1.1 hr/acre	0.10 lbs/acre
Grading	0.77 lbs/VMT	1 VMT/acre	0.80 lbs/acre
Vehicle Traffic (unpaved roads)	2.95 lbs/VMT	8.4 VMT/acre	24.80 lbs/acre

### Emissions Due to Wind Erosion of Soil Piles and Exposed Graded Surface

Reference: California Environmental Quality Act (CEQA) Air Quality Handbook, SCAQMD, 1993.

Soil Piles EF =  $1.7(s/1.5)[(365 - p)/235](I/15)(J) = (s)(365 - p)(I)(J)/(3110.2941)$ , p. A9-99.

Soil Piles EF = 9 lbs/day/acre covered by soil piles

Consider soil piles area fraction so that EF applies to graded area

Soil piles area fraction: 0.10 (Fraction of site area covered by soil piles)  
Soil Piles EF = 0.9 lbs/day/acres graded

Graded Surface EF = 26.4 lbs/day/acre (recommended in CEQA Manual, p. A9-93).

### Calculation of Annual PM10 Emissions

Source	Emission Factor	Graded Acres/yr	Exposed days/yr	Emissions lbs/yr	Emissions tons/yr
Bulldozing	0.10 lbs/acre	32.55	NA	3	0.00
Grading	0.80 lbs/acre	32.55	NA	26	0.01
Vehicle Traffic	24.80 lbs/acre	32.55	NA	807	0.40
Erosion of Soil Piles	0.90 lbs/acre/day	32.55	90	2,637	1.32
Erosion of Graded Surface	26.40 lbs/acre/day	32.55	90	77,350	38.67
<b>TOTAL</b>				<b>80,823</b>	<b>40.41</b>

Soil Disturbance EF: 25.70 lbs/acre  
Wind Erosion EF: 27.3 lbs/acre/day

Back calculate to get EF: 546.16 lbs/acre/grading day

## WINDO Implementation Plan Projects at Beale AFB, CA

### Construction (Grading) Schedule for CY 2006

Estimate of time required to grade a specified area.

#### Input Parameters

Construction area: 32.55 acres/yr (from "CY06 Combustion" Worksheet)  
 Qty Equipment: 12.00 (calculated based on 3 pieces of equipment for every 10 acres graded)

#### Assumptions.

Terrain is mostly flat.

An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.

200 hp bulldozers are used for site clearing.

300 hp bulldozers are used for stripping, excavation, and backfill.

Vibratory drum rollers are used for compacting.

Stripping, Excavation, Backfill and Compaction require an average of two passes each.

Excavation and Backfill are assumed to involve only half of the site.

#### Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 19th Ed., R. S. Means, 2005.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day)	equip-days per acre	Acres/yr (project- specific)	Equip-days per year
2230 200 0550	Site Clearing	Dozer & rake, medium brush	8	acre/day	8	0.13	32.55	4.07
2230 500 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	32.55	15.92
2315 432 5220	Excavation	Bulk, open site, common earth, 150' haul	800	cu. yd/day	0.99	1.01	16.28	16.41
2315 120 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	16.28	6.73
2315 310 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	2,300	cu. yd/day	2.85	0.35	32.55	11.42
TOTAL								54.55

#### Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 54.55  
 Qty Equipment: 12.00  
 Grading days/yr: 4.55

## WINDO Implementation Plan Projects at Beale AFB, CA

### Construction Combustion Emissions for CY 2007

Combustion Emissions of VOC, NOx, SO2, CO and PM10 Due to Construction

Includes:

1	100% of Demolish Parking Lots at Recce Point Club	100,960 ft <sup>2</sup>	2.32	acres
2	100% of Construct Parking Lots at Recce Point Club	231,210 ft <sup>2</sup>	5.31	acres
3	18% of Conduct Vernal Pool Restoration Phase 2	152,460 ft <sup>2</sup>	3.50	acres

NOTE: The projects listed above are FY06 funded projects. It is assumed that these projects will be completed sometime in CY07.

Total Building Construction Area:	0 ft <sup>2</sup>	None
Total Demolished Area:	100,960 ft <sup>2</sup>	(1)
Total Paved Area:	231,210 ft <sup>2</sup>	(2)
Total Disturbed Area:	484,630 ft <sup>2</sup>	(1, 2, and 3)
Construction Duration:	1.0 year(s)	
Annual Construction Activity:	230 days/yr	(assume 230 days/year unless project-specific data known)

#### Summary of Input Parameters

	Total Area (ft <sup>2</sup> )	Total Area (acres)	Total Days	
Grading:	484,630	11.13	3	(from "CY07 Grading" worksheet)
Paving:	231,210	5.31	26	
Demolition:	100,960	2.32	116	
Building Construction:	0	0.00	0	
Architectural Coating	0	0.00	0	(per the SMAQMD "Air Quality of Thresholds of Significance", 1994 version)

NOTE: The 'Total Days' estimate for paving is calculated by dividing the total number of acres by 0.21 acres/day, which is a factor derived from the 2005 MEANS Heavy Construction Cost Data, 19th Edition, for 'Asphaltic Concrete Pavement, Lots and Driveways - 6" stone base', which provides an estimate of square feet paved per day. There is also an estimate for 'Plain Cement Concrete Pavement', however the estimate for asphalt is used because it is more conservative. The 'Total Days' estimate for demolition is calculated by dividing the total number of acres by 0.02 acres/day, which is a factor also derived from the 2005 MEANS reference. This is calculated by averaging the demolition estimates from 'Building Demolition - Small Buildings, Concrete', assuming a height of 30 feet for a two-story building; from 'Building Footings and Foundations Demolition - 6" Thick, Plain Concrete'; and from 'Demolish, Remove Pavement and Curb - Concrete to 6" thick, rod reinforced'.

The 'Total Days' estimate for building construction is assumed to be the number of remaining construction days as a conservative estimate.

## Emission Factors Used for Construction Equipment

Reference: Guide to Air Quality Assessment, SMAQMD, 2004

Emission factors are taken from Table 3-2 for CY 2005. Assumptions regarding the type and number of equipment are from Table 3-1 unless otherwise noted.

### Grading

Equipment	No. Req <sup>d</sup> . <sup>a</sup> per 10 acres	NO <sub>x</sub> (lb/day)	VOC <sup>b</sup> (lb/day)	CO (lb/day)	SO <sub>2</sub> <sup>c</sup>	PM <sub>10</sub> (lb/day)
Bulldozer	1	29.40	3.66	25.09	0.59	1.17
Motor Grader	1	10.22	1.76	14.98	0.20	0.28
Water Truck	1	20.89	3.60	30.62	0.42	0.58
Total per 10 acres of activity	3	60.51	9.02	70.69	1.21	2.03

### Paving

Equipment	No. Req <sup>d</sup> . <sup>a</sup> per 10 acres	NO <sub>x</sub> (lb/day)	VOC <sup>b</sup> (lb/day)	CO (lb/day)	SO <sub>2</sub> <sup>c</sup>	PM <sub>10</sub> (lb/day)
Paver	1	7.93	1.37	11.62	0.16	0.22
Roller	1	5.01	0.86	7.34	0.10	0.14
Total per 10 acres of activity	2	12.94	2.23	18.96	0.26	0.36

### Demolition

Equipment	No. Req <sup>d</sup> . <sup>a</sup> per 10 acres	NO <sub>x</sub> (lb/day)	VOC <sup>b</sup> (lb/day)	CO (lb/day)	SO <sub>2</sub> <sup>c</sup>	PM <sub>10</sub> (lb/day)
Loader	1	7.86	1.35	11.52	0.16	0.22
Haul Truck	1	20.89	3.60	30.62	0.42	0.58
Total per 10 acres of activity	2	28.75	4.95	42.14	0.58	0.80

### Building Construction

Equipment <sup>d</sup>	No. Req <sup>d</sup> . <sup>a</sup> per 10 acres	NO <sub>x</sub> (lb/day)	VOC <sup>b</sup> (lb/day)	CO (lb/day)	SO <sub>2</sub> <sup>c</sup>	PM <sub>10</sub> (lb/day)
<b>Stationary</b>						
Generator Set	1	11.83	1.47	10.09	0.24	0.47
Industrial Saw	1	17.02	2.12	14.52	0.34	0.68
Welder	1	4.48	0.56	3.83	0.09	0.18
<b>Mobile (non-road)</b>						
Truck	1	20.89	3.60	30.62	0.84	0.58
Forklift	1	4.57	0.79	6.70	0.18	0.13
Crane	1	8.37	1.44	12.27	0.33	0.23
Total per 10 acres of activity	6	67.16	9.98	78.03	2.02	2.27

Note: Footnotes for tables are on following page



### Architectural Coatings

Equipment	No. Req <sup>d</sup> . <sup>a</sup> per 10 acres	NOx (lb/day)	VOC <sup>b</sup> (lb/day)	CO (lb/day)	SO <sub>2</sub> <sup>c</sup>	PM <sub>10</sub> (lb/day)
Air Compressor	1	6.83	0.85	5.82	0.14	0.27
Total per 10 acres of activity	1	6.83	0.85	5.82	0.14	0.27

- a) The SMAQMD 2004 guidance suggests a default equipment fleet for each activity, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.
- b) The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC.
- c) The SMAQMD 2004 reference does not provide SO<sub>2</sub> emission factors. For this worksheet, SO<sub>2</sub> emissions have been estimated based on approximate fuel use rate for diesel equipment and the assumption of 500 ppm sulfur diesel fuel. For the average of the equipment fleet, the resulting SO<sub>2</sub> factor was found to be approximately 0.04 times the NOx emission factor for the mobile equipment (based upon 2002 USAF IERA "Air Emissions Inventory Guidance") and 0.02 times the NOx emission factor for all other equipment (based on AP-42, Table 3.4-1)
- d) Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

### PROJECT-SPECIFIC EMISSION FACTOR SUMMARY

Source	Equipment Multiplier*	SMAQMD Emission Factors (lb/day)				
		NOx	VOC	CO	SO <sub>2</sub> **	PM10
Grading Equipment	2	121.02	18.04	141.38	2.42	4.06
Paving Equipment	1	12.94	2.23	18.96	0.26	0.36
Demolition Equipment	1	28.75	4.95	42.14	0.58	0.80
Building Construction	1	67.16	9.98	78.03	2.02	2.27
Air Compressor for Architectural Coating	1	6.83	0.85	5.82	0.14	0.27
Architectural Coating**			0.00			

\*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project

\*\*Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994

### Annual Emissions by Activity (lbs/yr)

	NOx	VOC	CO	SO2	PM10
Grading Equipment	376.0	56.1	439.3	7.5	12.6
Paving	336.4	58.0	493.0	6.7	9.4
Demolition	3335.0	574.2	4888.2	66.7	92.8
Building Construction	0.0	0.0	0.0	0.0	0.0
Architectural Coatings	0.0	0.0	0.0	0.0	0.0
<b>Total Emissions (lbs/yr):</b>	<b>4047.5</b>	<b>688.2</b>	<b>5820.5</b>	<b>80.9</b>	<b>114.8</b>

### Results: Daily and Annual Emission Rates

	NOx	VOC	CO	SO2	PM10
Emissions, average lbs/day	4047.45	688.23	5820.47	80.95	114.77
Emissions, tons/yr	2.02	0.34	2.91	0.04	0.06

## WINDO Implementation Plan Projects at Beale AFB, CA

### Construction Fugitive Dust Emissions for CY 2007

Calculation of PM10 Emissions Due to Site Preparation (Uncontrolled).

#### User Input Parameters / Assumptions

Acres graded per year:	11.13	acres/yr	(From "CY07 Combustion" worksheet)
Grading days/yr:	3.11	days/yr	(From "CY07 Grading" worksheet)
Exposed days/yr:	90	assumed days/yr	graded area is exposed
Grading Hours/day:	8	hr/day	
Soil piles area fraction:	0.10	(assumed fraction of site area covered by soil piles)	
Soil percent silt, s:	8.5	%	(mean silt content; expected range: 0.56 to 23, AP-42 Table 13.2.2-1)
Soil percent moisture, M:	50	%	(NOAA 2005 <a href="http://www.cpc.noaa.gov/products/soilmst/w.html">http://www.cpc.noaa.gov/products/soilmst/w.html</a> )
Annual rainfall days, p:	60	days/yr	rainfall exceeds 0.01 inch/day (AP-42 Fig 13.2.2-1)
Wind speed > 12 mph %, I:	21.5	%	Ave. wind speed at Yuba City, CA ( <a href="http://www.epa.gov/ttn/naaqs/ozone/areas/wind.htm">http://www.epa.gov/ttn/naaqs/ozone/areas/wind.htm</a> )
Fraction of TSP, J:	0.5	per California Environmental Quality Act (CEQA) Air Quality Handbook, SCAQMD, 1993, p. A9-99	
Mean vehicle speed, S:	5	mi/hr	(On-site)
Dozer path width:	8	ft	
Qty construction vehicles:	6.00	vehicles	(From "CY07 Grading" worksheet)
On-site VMT/vehicle/day:	5	mi/veh/day	(Excluding bulldozer VMT during grading)
PM10 Adjustment Factor k	1.5	lb/VMT	(AP-42 Table 13.2.2-2 12/03 for PM10 for unpaved roads)
PM10 Adjustment Factor a	0.9	(dimensionless)	(AP-42 Table 13.2.2-2 12/03 for PM10 for unpaved roads)
PM10 Adjustment Factor b	0.45	(dimensionless)	(AP-42 Table 13.2.2-2 12/03 for PM10 for unpaved roads)
Mean Vehicle Weight W	40	tons	assumed for aggregate trucks

TSP - Total Suspended Particulate

VMT - Vehicle Miles Traveled

## Emissions Due to Soil Disturbance Activities

### Operation Parameters (Calculated from User Inputs)

Grading duration per acre	2.2 hr/acre	
Bulldozer mileage per acre	1 VMT/acre	(Miles traveled by bulldozer during grading)
Construction VMT per day	30 VMT/day	
Construction VMT per acre	8.4 VMT/acre	(Travel on unpaved surfaces within site)

### Equations Used (Corrected for PM10)

Operation	Empirical Equation	Units	AP-42 Section (5th Edition)
Bulldozing	$0.75(s^{1.5})/(M^{1.4})$	lbs/hr	Table 11.9-1, Overburden
Grading	$(0.60)(0.051)s^{2.0}$	lbs/VMT	Table 11.9-1,
Vehicle Traffic (unpaved roads)	$[(k(s/12)^a (W/3)^b)] [(365-P)/365]$	lbs/VMT	Section 13.2.2

Source: Compilation of Air Pollutant Emission Factors, Vol. I, USEPA AP-42, Section 11.9 dated 10/98 and Section 13.2 dated 12/03

### Calculation of PM10 Emission Factors for Each Operation

Operation	Emission Factor (mass/ unit)	Operation Parameter	Emission Factor (lbs/ acre)
Bulldozing	0.08 lbs/hr	2.2 hr/acre	0.20 lbs/acre
Grading	0.77 lbs/VMT	1 VMT/acre	0.80 lbs/acre
Vehicle Traffic (unpaved roads)	2.95 lbs/VMT	8.4 VMT/acre	24.80 lbs/acre

### Emissions Due to Wind Erosion of Soil Piles and Exposed Graded Surface

Reference: California Environmental Quality Act (CEQA) Air Quality Handbook, SCAQMD, 1993.

Soil Piles EF =  $1.7(s/1.5)[(365 - p)/235](I/15)(J) = (s)(365 - p)(I)(J)/(3110.2941)$ , p. A9-99.

Soil Piles EF = 9 lbs/day/acre covered by soil piles

Consider soil piles area fraction so that EF applies to graded area

Soil piles area fraction: 0.10 (Fraction of site area covered by soil piles)

Soil Piles EF = 0.9 lbs/day/acres graded

Graded Surface EF = 26.4 lbs/day/acre (recommended in CEQA Manual, p. A9-93).

### Calculation of Annual PM10 Emissions

Source	Emission Factor	Graded Acres/yr	Exposed days/yr	Emissions lbs/yr	Emissions tons/yr
Bulldozing	0.20 lbs/acre	11.13	NA	2	0.00
Grading	0.80 lbs/acre	11.13	NA	9	0.00
Vehicle Traffic	24.80 lbs/acre	11.13	NA	276	0.14
Erosion of Soil Piles	0.90 lbs/acre/day	11.13	90	901	0.45
Erosion of Graded Surface	26.40 lbs/acre/day	11.13	90	26,434	13.22
<b>TOTAL</b>				<b>27,623</b>	<b>13.81</b>

Soil Disturbance EF: 25.80 lbs/acre

Wind Erosion EF: 27.3 lbs/acre/day

Back calculate to get EF: 799.09 lbs/acre/grading day

## WINDO Implementation Plan Projects at Beale AFB, CA

### Construction (Grading) Schedule for CY 2007

Estimate of time required to grade a specified area.

#### Input Parameters

Construction area: 11.13 acres/yr (from "CY07 Combustion" Worksheet)  
 Qty Equipment: 6.00 (calculated based on three pieces of equipment per every 10 acres)

#### Assumptions.

Terrain is mostly flat.

An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.

200 hp bulldozers are used for site clearing.

300 hp bulldozers are used for stripping, excavation, and backfill.

Vibratory drum rollers are used for compacting.

Stripping, Excavation, Backfill and Compaction require an average of two passes each.

Excavation and Backfill are assumed to involve only half of the site.

#### Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 19th Ed., R. S. Means, 2005.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day)	equip-days per acre	Acres/yr (project- specific)	Equip-days per year
2230 200 0550	Site Clearing	Dozer & rake, medium brush	8	acre/day	8	0.13	11.13	1.39
2230 500 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	11.13	5.44
2315 432 5220	Excavation	Bulk, open site, common earth, 150' haul	800	cu. yd/day	0.99	1.01	5.56	5.61
2315 120 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	5.56	2.30
2315 310 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	2,300	cu. yd/day	2.85	0.35	11.13	3.90
TOTAL								18.64

#### Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 18.64  
 Qty Equipment: 6.00  
 Grading days/yr: 3.11

## WINDO Implementation Plan Projects at Beale AFB, CA

### Sacramento Vally Intrastate AQCR (SVIAQCR)

Row #	State	County	Area Source Emissions				Point Source Emissions					
			CO	NOx	PM10	SO2	VOC	CO	NOx	PM10	SO2	VOC
1	CA	Butte Co	81,173	9,149	11,704	624	12,583	944	329	393	2.35	204
2	CA	Colusa Co	26,106	2,663	8,376	201	3,244	261	872	403	10.7	245
3	CA	Glenn Co	26,377	3,000	6,748	306	3,726	1,042	506	522	34.8	190
4	CA	Sacramento Co	276,289	41,822	22,017	1,524	40,106	432	360	504	35.9	613
5	CA	Shasta Co	104,562	10,162	13,450	1,010	12,356	6,935	2,708	648	327	318
6	CA	Solano Co	98,417	15,568	9,947	762	19,088	1,734	3,914	416	5,815	1,591
7	CA	Sutter Co	40,868	4,595	7,567	306	5,906	226	800	631	5.45	47
8	CA	Tehama Co	30,374	4,166	7,667	665	3,821	452	223	104	1.7	46.9
9	CA	Yolo Co	42,671	8,623	12,388	498	7,932	699	808	871	381	292
10	CA	Yuba Co	29,144	3,338	4,172	231	4,311	128	368	283	38.8	48.3
Grand Total			755,981	103,086	104,037	6,126	113,073	12,852	10,888	4,775	6,652	3,595

<http://www.epa.gov/air/data/states/calist.html?co~CA~>

USEPA - AirData NET Tier Report

\*Net Air pollution sources (area and point) in tons per year (1999)

Site visited on May 4, 2005



**Appendix C**  
**Branchiopod Habitat in Vicinity of Proposed Action**





DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS 9TH MISSION SUPPORT GROUP (ACC)  
BEALE AIR FORCE BASE, CALIFORNIA

MAY 26 2005


MEMORANDUM FOR U.S. FISH AND WILDLIFE SERVICE

ATTN: MR. KEN FULLER  
2800 Cottage Way, Room W2605  
Sacramento, CA 95825-1846

FROM: 9 CES/CC  
6451 B Street  
Beale AFB CA 95903-1708

SUBJECT: Wing Infrastructure Development Outlook Plan (WINDO) 2005 Implementation at  
Beale Air Force Base (AFB), California

1. The intent of this letter is to initiate Formal Consultation under Section 7(a)(2) of the Endangered Species Act of 1973, as amended, for the WINDO 2005 Implementation at Beale AFB, California.
2. Based on a U.S. Fish and Wildlife Service (USFWS) site visit on 28 Jan 05, a meeting at the USFWS Sacramento Field Office on 28 Apr 05, and subsequent email correspondence with a USFWS staff biologist, we believe that the WINDO 2005 projects (Distributed Common Ground System (DCGS) Parking Lot, Site 38 Remedial Action, and Vernal Pool Restoration, Phase 2/Site 1) will result in direct impacts to 0.46 acres and indirect impacts to 0.92 acres of disturbed seasonal wetlands and vernal pools. These wetlands are potential habitat for the vernal pool fairy shrimp (*Branchinecta lynchi*) and the vernal pool tadpole shrimp (*Lepidurus packardii*). In order to minimize or compensate for these impacts, approximately 2.75 acres of suitable branchiopod habitat will be preserved and 0.46 acres of suitable branchiopod habitat will be restored.
3. Please review the enclosed documents, and contact Ms. Kirsten Christopherson at (530) 634-2643 if you need additional information.

  
GREGORY P. LONG, Lt Col, USAF  
Base Civil Engineer

Attachment:  
Biological Assessment of Wing Infrastructure Development Outlook 2005 at Beale Air Force Base, California.

*Global Power for America*

***THIS PAGE INTENTIONALLY LEFT BLANK***

# **Summary of Proposed Action Direct and Indirect Impacts and Minimization/Compensation Requirements**

Project	Impacted Area		Preservation		Restoration		Total Compensation Requirements
	Direct	Indirect	Direct	Indirect	Direct	Indirect	
Construct Heritage Park	0.21	0.57	0.41	1.13	0.21	0.00	1.75
Construct Visitor Center Main Gate	0.00	0.02	0.00	0.05	0.00	0.00	0.05
Total	0.21	0.59	0.41	1.18	0.21	0.00	1.80

**Total Acres Impacted (Direct and Indirect)**    **0.7955**  
**Total Preservation**    **1.5910**  
**Total Restoration**    **0.2062**  
**Total Compensation Requirements**    **1.7972**

## **Summary of Proposed Action Temporary Impacts**

Project	Impacted Area Temporary
Vernal Restoration Phase 2	12.00
<b>Total</b>	<b>12.00</b>

**Proposed Action Direct Impacts**

Project	Wetland Type	Wetland ID	Label	Acreage
Construct Heritage Park	DISTURBED SEASONAL WETLAND	HP369	PEM1x	0.1382
Construct Heritage Park	DISTURBED SEASONAL WETLAND	HP504	PEM1x	0.0679
Total				<b>0.2062</b>

**Proposed Action Indirect Impacts**

Project Area	Wetland ID#	Wetland Type	Label	Acreage
Construct Heritage Park	DISTURBED SEASONAL WETLAND	HP371	PEM1x	0.0293
Construct Heritage Park	DISTURBED SEASONAL WETLAND	HP380A	PEM1x	0.0422
Construct Heritage Park	DISTURBED SEASONAL WETLAND	HP381	PEM1x	0.0164
Construct Heritage Park	DISTURBED SEASONAL WETLAND	HP383A	PEM1x	0.0018
Construct Heritage Park	DISTURBED SEASONAL WETLAND	HP383B	PEM1x	0.0044
Construct Heritage Park	DISTURBED SEASONAL WETLAND	HP430	PEM1x	0.3414
Construct Heritage Park	DISTURBED SEASONAL WETLAND	HP436	PEM1x	0.0027
Construct Heritage Park	VERNAL POOL	HP431A	PEM1J	0.1196
Construct Heritage Park	VERNAL POOL	HP431B	PEM1J	0.0038
Construct Heritage Park	VERNAL POOL	HP431C	PEM1J	0.0038
Total				<b>0.5653</b>
Construct Visitor Center Main Gate	VERNAL POOL	VP-60	PEM1J	0.0240
Total				<b>0.0240</b>



# **Proposed Action Temporary Impacts**

Project	Wetland Type	Wetland ID	Label	Acreage
Vernal Pool Restoration Phase 2/Main Gate Inoculum	OTHER SEASONAL WETLAND	DSW-56	PEM1	0.0926
Vernal Pool Restoration Phase 2/Main Gate Inoculum	OTHER SEASONAL WETLAND	DSW-57	PEM1	0.0085
Vernal Pool Restoration Phase 2/Main Gate Inoculum	OTHER SEASONAL WETLAND	DSW-58	PEM1	0.0278
Vernal Pool Restoration Phase 2/Main Gate Inoculum	VERNAL POOL	VP-56	PEM1J	0.0813
Vernal Pool Restoration Phase 2/Main Gate Inoculum	VERNAL POOL	VP-54	PEM1J	0.0612
Vernal Pool Restoration Phase 2/Main Gate Inoculum	VERNAL POOL	VP-52	PEM1J	0.0493
Vernal Pool Restoration Phase 2/Main Gate Inoculum	VERNAL POOL	VP-58	PEM1J	0.0565
Vernal Pool Restoration Phase 2/Main Gate Inoculum	VERNAL POOL	VP-53	PEM1J	0.3306
Vernal Pool Restoration Phase 2/Main Gate Inoculum	VERNAL POOL	VP-178	PEM1J	1.1891
Vernal Pool Restoration Phase 2/Main Gate Inoculum	VERNAL POOL	VP-57	PEM1J	0.0409
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0512
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.4616
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.1136
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0478
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.1030
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0755
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.2129
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0481
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0711
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0336
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0389
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0233
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0202
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0403
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0619
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.1283
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0753
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.1405
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.1834
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.1258
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.3599
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.3154
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0518
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.1445
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.1006
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.2169
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0561
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.1121
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.1066
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.1654
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0865
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0817
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0302
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0189
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0214
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0213
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0579

Project	Wetland Type	Wetland ID	Label	Acreage
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0266
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0116
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0293
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0357
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0140
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0155
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0193
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0140
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0189
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0081
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0214
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0213
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0284
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0579
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.1121
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.1056
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.1522
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.1335
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0815
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0263
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0493
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0266
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0991
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0269
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0839
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0388
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0225
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0595
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0505
Vernal Pools Restoration Phase 2/ Site 2	VERNAL POOL	NA	PEM1J	0.0813
Vernal Pools Restoration Phase 2/ Site 1	VERNAL POOL	4	PEM1J	0.9095
Vernal Pools Restoration Phase 2/ Site 1	VERNAL POOL	3	PEM1J	1.4915
Vernal Pools Restoration Phase 2/ Site 1	VERNAL POOL	2	PEM1J	1.5802
Vernal Pools Restoration Phase 2/ Site 1	VERNAL POOL	1	PEM1J	0.6062
			Total	<b>12.0004</b>

***THIS PAGE INTENTIONALLY LEFT BLANK***

**Appendix D**  
**Global Hawk LRE Cables Soils Report**





# MEMORANDUM

---

**TO:** MS. KIRSTEN CHRISTOPHERSON (9 CES/CEV)  
**FROM:** MR. WILLIAM C. LAROW, PG  
**SUBJECT:** SOILS CLASSIFICATION TO LOCATE THE AQUA/HARD PAN  
ASSOCIATED WITH VERNAL POOLS, GLOBAL HAWK LRE SITE,  
BEALE AIR FORCE BASE (AFB), CALIFORNIA  
**DATE:** 15 FEBRUARY 2005

---

## **INTRODUCTION**

This MEMO summarizes field activities performed by e<sup>2</sup>M occurring from 2 - 3 February 2005 at the Global Hawk Launch and Recovery Element (LRE) site located on Beale Air Force Base (AFB), California.

The LRE area was constructed west of the Fire Station 1 to support the Global Hawk mission (Refer to Figure 1). Within the LRE, there are three Differential Global Positioning System (DGPS) antennas. Mobile Global Hawk equipment connects to these DGPS antennas randomly throughout the year to conduct their mission requirements. Originally, it was planned to lay antenna cables that would connect the mobile Global Hawk equipment to the DGPS antennas. This concept was dismissed because of the sensitivity of these cables and the cost of replacing damaged cable lines. Therefore, the base proposes to install three buried antenna cable lines to areas within the LRE. The trenches for these cables would be approximately 6 inches wide and 2 feet deep. The trenches would be constructed using a walk-behind chain trencher, which could disturb a path up to 18 inches wide.

Because the LRE area has sensitive environments (vernal pools), it is a concern that trenching activities can disturb these vernal pools. There is a soil layer called the aqua/hard pan that is a key element in creating these pools. It is believed that puncturing this aqua/hard pan could inhibit water from collecting and affecting the ecosystem dependent on the pooled water. The location of this aqua/hard pan is critical in order to limit the effects from the trenching activities.

## **PURPOSE**

To determine where the aqua/hard pan layer is located along the proposed cable lines to insure that trenching activities will not impact the sensitive environments (vernal pools).

## **SITE ACTIVITIES AND FIELD OBSERVATIONS**

### **2 February 2005**

On 2 February 2005 e<sup>2</sup>M personnel Sean McCain (Project Manager), Bill LaRow (Professional Geologist) and Larry Dean (Wetland Specialist) had a meeting to discuss the project objectives, health and safety and specific logistic concerns when working at Beale AFB.

Site activities started at approximately 1110, 2 February 2005, Mr. McCain gave Mr. LaRow a site walk through showing the location where the proposed cable was going to be placed and its relative position to the designated vernal pools. Refer to Figure 1 for the proposed cable lines and vernal pools (Photo 1).

After the site walk through, Mr. LaRow marked 9 test pit locations along the proposed trench line that had best aerial representation, but were far enough away from the vernal pools so not to disturb them. To keep track of the test pits, the three proposed utility lines were labeled A, B, and C. "A" marked the southern proposed utility line, the middle line was designated as "B" and "C" was the northern line (Photos #2, #3 and #4). Each test pit location was labeled using the following example "LRE – A1". LRE was for the general site location; A, B, or C for the corresponding line; and a number for the sequential numbering of each test pit, starting with 1 for the far west test pit. Ideally total depth for each test pit was to be 24 inches, but large cobbles throughout the area created difficult conditions for digging by spade shovel (Photo #5). The total depth for the test pits ranged from 18 to 22 inches below ground surface (bgs). Refer to Figure 2 for total depth of test pits.

Test pits started at LRE-A1 and proceeded easterly along the A line, the soil lithology was very similar, a sandy clay with gravel and cobbles with variations of sand content. No soil being described as aqua/hard pan was found along the A line.

e<sup>2</sup>M proceeded to LRE-B3, and at this test pit a layer of sandstone was encountered at 7 inches bgs. The sandstone was dark reddish brown, poorly cemented, well sorted and was relatively difficult to dig through. Because of the difficult digging and the aqua/hard pan being described as very hard raised suspicion that the sandstone could possibly be the aqua/hard pan. It was decided not to dig below the sandstone until Mr. McCain and Mr. Dean could confirm that the sandstone was not the hard pan being described in the soil survey and what they have observed under previous vernal pools in the area. After speaking to Mr. McCain, Mr. LaRow was informed that both Mr. McCain and Mr. Dean would not be able to look at the sandstone until the following morning.

With the limited amount of time, Mr. LaRow proceeded to test pit LRE-B1 expecting similar lithology previously found at LRE-A1 (sandy clay with gravel and cobbles), this would allow the continuation of the investigation. Sandy clay with gravel and cobbles were found as expected in test pits LRE-B1, LRE-C1 and LRE-C2. At test pit LRE-C3 and LRE-B2, the same sandstone found in LRE-B3 was encountered at 12 inches bgs and 8 inches bgs, respectfully (Refer to Figure 2 and Photo #6). After reaching the sandstone in LRE-B2 it was decided to discontinue working until a determination could be made on whether the sandstone is the aqua/hard pan.

### **3 February 2005**

At approximately 0740 on 3 February 2005, e<sup>2</sup>M personnel met at the LRE Site to discuss the sandstone layer found in test pits LRE-B2, LRE-B3 and LRE-C3. It was decided that because the sandstone was not of the same characteristics as the description documented in the soil survey that an extra test pit was necessary to assist in determining if this sandstone was the aqua/hard pan. The 10<sup>th</sup> test pit (LRE-C4) was chosen in an area designated as a vernal pool, the rationale for the location was to increase the likelihood of encountering the aqua/hard pan. The test pit was not located in the center of the vernal pool, but adjacent in order to limit impact to the vernal pool. Total depth of the test pit was to 22 inches, and digging was relatively easy, indicating very little gravel and no cobbles. From 0 – 2 inches bgs was a wet sandy clay with organics; from 2-6 inches bgs was a moist (wet at top) medium clay, with some silt and sand and trace of gravel; from 6-20 inches bgs was a moist slightly sandy clay (Refer to Figure 2). No aqua/hard pan as described in the soil survey and no sandstone was observed in test pit LRE-C4.

### **CONCLUSION**

In conclusion a majority of the test pits showed sandy clay with gravel and cobbles, with the exception of test pits LRE-B3, LRE-B2, LRE-C3 and LRE-C4.

Test pits LRE-B2, LRE-B3, and LRE-C3 had poorly cemented, well-sorted dark reddish brown sandstone. The total depth of the sandstone is not known, but is at least 18 inches bgs, and the minimum observed thickness was 6 inches. It was determined that this sandstone was not the aqua/hard pan when compared to previous soil investigations and to LRE-C4.

LRE-C4 test pit was added after encountering the suspicious sandstone in an attempt to find the aqua/hard pan as described in the soil survey to be used as a reference. However, no fatty clay was observed, instead silty (lean) clay with trace amounts of sand and gravel was encountered. This layer of silty clay was at approximately 2 - 6 inches bgs and was only found at LRE-C4. This greater clay content relative to the other test pits and the low depressional topography would account for the standing water, but in order to characterize the soil as an aqua/hard pan it would require more information other than the unified soil classification. No test pits had the soil characteristics of the aqua/hard pan as described in the soil survey or explained in conversation.



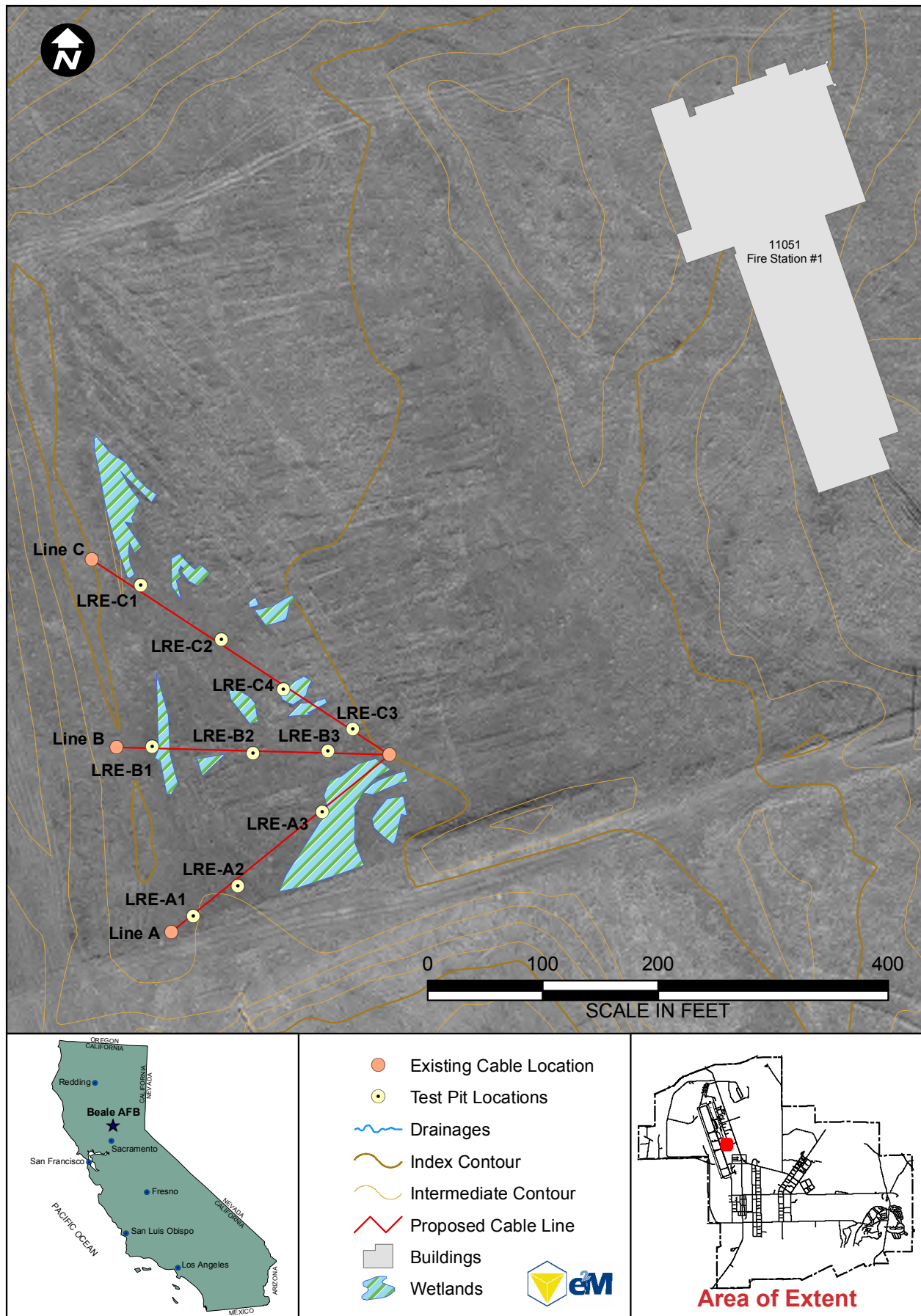
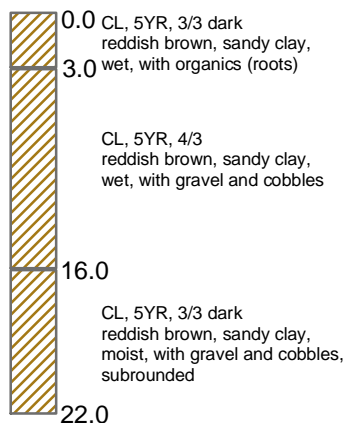
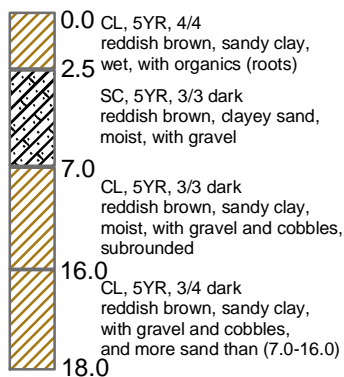


Figure 1. Test Pit locations at LRE Global Hawk

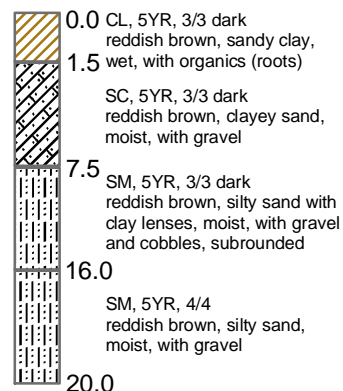
### LRE-A1



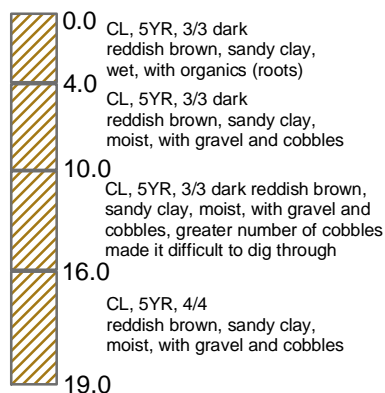
### LRE-A2



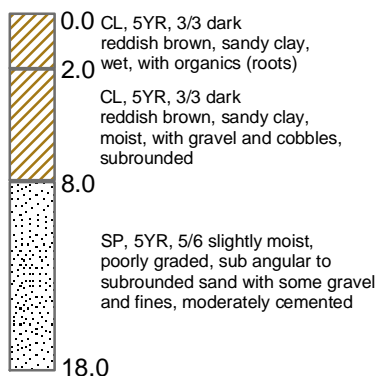
### LRE-A3



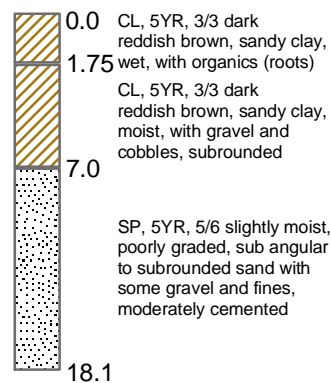
### LRE-B1



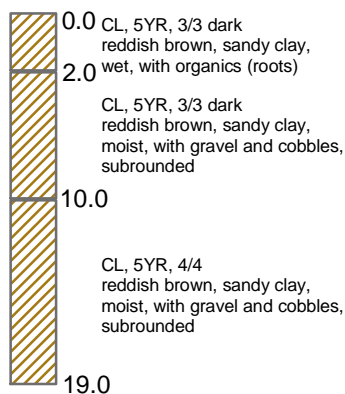
### LRE-B2



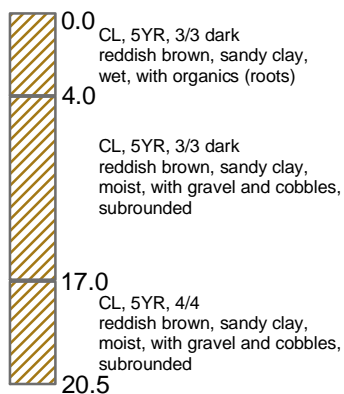
### LRE-B3



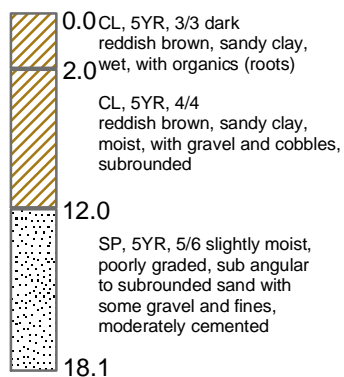
### LRE-C1



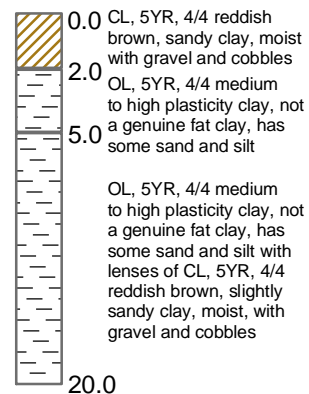
### LRE-C2



### LRE-C3



### LRE-C4



**Figure 2:  
LRE Site Soil Lithology**





Photo 1 – Vernal Pools located in LRE area.





Photo 2 – Line A (northeast view).



Photo 3 – Line B (east view).





Photo 4 – Line C (southeast view).



Photo 5 – Test pit (LRE-A2).





Photo 6 – Sandstone with pooled water (LRE-B2).



***THIS PAGE INTENTIONALLY LEFT BLANK***

**Appendix E**  
**Jurisdictional Waters of the U.S. Impacted by Proposed Action**





# United States Department of the Interior

## FISH AND WILDLIFE SERVICE

Sacramento Fish and Wildlife Office  
2800 Cottage Way, Room W-2605  
Sacramento, California 95825-1846



In reply refer to:  
1-1-05-F-0165

**JUN 24 2005**

Lt. Col. Gregory P. Long  
Base Civil Engineer  
Department of the Air Force  
9<sup>th</sup> CES/CEV  
6451 B Street  
Beale Air Force Base, California 95903-1708

Subject: Formal Endangered Species Consultation on the Proposed Site 38  
Remediation, DCGS Parking Lot Construction, and Phase 2 Vernal Pool  
Restoration, Beale Air Force Base, Yuba County, California

Dear Lt. Col. Long:

The U.S. Fish and Wildlife Service (Service) has received your May 26, 2005, letter requesting formal consultation and has reviewed the information you have provided for the proposed Site 38 Remediation, DCGS Parking Lot Construction, and Phase 2 Vernal Pool Restoration projects (projects), on Beale Air Force Base (Beale AFB), Yuba County. Your May 29, 2005 *Windo Biological Assessment* and request for consultation were received on June 8, 2005. This document represents the Service's biological opinion on the potential effects of the proposed actions on the threatened vernal pool fairy shrimp (*Branchinecta lynchi*) and the endangered vernal pool tadpole shrimp (*Lepidurus packardii*) in accordance with section 7(a)(2) of the Endangered Species Act of 1973, as amended (Act).

This biological opinion is based, in part, on information provided in the: (1) *Final Conceptual Vernal Pool Restoration and Monitoring for the Habitat Conservation and Management Plan for Beale Air Force Base* (CVPRM) (Jones and Stokes 1998a); (2) the April, 2000, *Final Soil Suitability Assessment for a Portion of the Vernal Pool Restoration Area, Beale Air Force Base*; (3) the June, 2000, *Wetland Delineation for the Vernal Pool Seasonal Wetland Restoration Design at Beale Air Force Base*; (4) the August, 2001, *Delineation of Waters of the United States for Areas Potentially Included in the Habitat Conservation and Management Plan for Beale Air Force Base*; (5) the *Windo Biological Assessment, Beale AFB* (Beale 2005); (6) a January 28, 2005, site visits to the proposed project areas at Beale AFB by Ken Fuller of the Service and Kirsten Christopherson of Beale AFB; (7) the *Integrated Natural Resources*



*Management Plan, Beale Air Force Base, California March 2005 to March 2009* (Beale AFB 2005); (8) an April 26, 2005, meeting between Kirsten Christopherson and Ken Fuller to discuss the proposed projects and draft biological assessment; (9) the May 26, 2005, letter from Robert L. Nordahl of Beale AFB to the Service requesting formal consultation on the proposed projects; (10) telephone calls and electronic mail communications between Kirsten Christopherson and Ken Fuller; and (11) other information available to the Service.

### **Consultation History**

*January 28, 2005.* Ken Fuller of the Service attended a site visit that was conducted by Kirsten Christopherson at the proposed project areas at Beale AFB.

*March 2005.* The *Integrated Natural Resources Management Plan, Beale AFB, March 2005 to March 2009*, prepared by Engineering Environmental Management, Inc., was completed and signed.

*April 26, 2005.* A meeting between the representatives of the Service and Beale AFB was held in Sacramento, California, to discuss the draft biological assessment for the proposed projects at Beale AFB.

*June 8, 2005.* The Service received a letter requesting formal consultation and a biological assessment for the proposed projects.

### **Project Descriptions**

The proposed projects at Beale AFB include the Site 38 Remediation, the DCSG Parking Lot Construction and Phase 2/Site 1 of Vernal Pool Restoration. Beale AFB decided to assume the presence of federally-listed vernal pool crustaceans in the seasonal wetlands on the three proposed project sites.

#### *Site 38 Remediation*

Site 38 is a former skeet range located in the midwestern portion of Beale AFB. Beale AFB wants to reuse this 32.6-acre site for training purposes. This site contains 0.42 acre of seasonal wetlands that provide suitable habitat for the federally listed vernal pool invertebrates. Additionally, another 0.92 acre of suitable vernal pool crustacean habitat would be indirectly affected by the proposed project. Beale AFB proposes to compensate for these losses by preserving 2.68 acres and restoring 0.42 acres on Beale AFB. It is estimated that as much 4,500 cubic yards of surficial lead and polyaromatic hydrocarbons may need to be excavated and removed. Soils excavation would vary between 1 to 4 feet in depth. Once soil testing has been

completed to achieved a 95 percent upper confidence level of human health and ecological risk, the site would be backfilled using borrow materials from on Beale AFB. Once backfilled and compacted, a mock runway would be constructed. If no such mock runway is constructed, the site would be seeded with native grasses.

#### *DCSG Parking Lot Construction*

The proposed DCSG parking lot is located at the intersection of 10<sup>th</sup> and B Streets towards the center of Beale AFB, and the proposed lot area is 400 feet by 400 feet. When finished by leveling and asphalt surfacing, the proposed lot would accommodate 425 parking spaces and the lot space would have two entrances/exits. Direct effects to suitable vernal pool crustacean habitat would be 0.04 acre and no indirect effects are anticipated. Beale AFB proposes to compensate by preserving 0.09 acre and restoring 0.04 acre of vernal pools on Beale AFB.

#### *Vernal Pool Restoration, Phase 2/Site 1*

In 2001, Beale AFB completed restoration efforts on just over 16 wetted acres vernal pools on 212 acres on Beale AFB during the Phase 1. The second phase of vernal pool restoration on Beale AFB, Phase 2, would be accomplished in a similar manner with the same design criteria, approximate density, construction, and monitoring that were used previously during Phase 1. Additional detailed information is found in the *Habitat Conservation and Management Plan*. Phase 2 vernal pool restoration is scheduled during the summer of 2005 and would result in the construction of approximately 10.84 acres of vernal pools/swales within the vernal pool restoration area on the western side of Beale AFB. The first source of vernal pool inoculum would be from those vernal pools that are slated for fill during proposed construction activities at the Main Gate in either 2006 or 2007. The Main Gate parking expansion area contains 1.98 acres of vernal pools and Beale AFB will prepare a separate biological assessment for that project. From these seasonal wetlands near the Main Gate, Beale AFB will remove the top six inches in two lifts via front end loader and dump truck, transport, and spread that soil inoculum to the newly restored vernal pools at Site 1. If needed, a second vernal pool soil inoculum source would be those four existing smeared and shallow vernal pools at Site 1. No more than 50 percent of the surface of any of the four smeared vernal pools would be scraped to a depth of six inches and the total scraped vernal pool area would not exceed 4.55 acres. Therefore, in summary, up to 6.55 wetted acres (1.98 plus 4.55=6.55) of vernal pools may be harvested for vernal pool soil inoculum. Hydrological, vegetation, and wildlife monitoring would be conducted variously in the newly restored vernal pools over a period of 10 years from the year of construction.

#### *Avoidance, Minimization and Compensation Measures For the Proposed Projects*

A qualified biologist will monitor all construction activities to ensure compliance with the avoidance, minimization, and compensation components of the proposed actions. The biological monitor would assist construction personnel in compliance with conservation measures and

guidelines. The biological monitor would be responsible for directing the placement of all stakes, flags, and barriers that protect sensitive resource area and for conducting environmental awareness training for construction crews before any new construction personnel join the work force. Awareness training would be conducted prior to the start of any construction activities and would include all restrictions and guidelines to avoid and minimize effects to vernal pools, sensitive species and wetlands.

Construction crews would observe the following guidelines and restrictions: (1) construction activities will be allowed from May 1 to October 1, (2) all vehicle operators will observe the posted 20 mph speed limit on unpaved roads and posted speed limits on paved roads, (3) off-road vehicle travel will be prohibited outside of designated work areas, (4) no non-military firearms or pets will be allowed in the proposed work areas, and (5) all motor vehicles and equipment will be fueled in designated service areas. All construction work and staging areas near suitable vernal pool crustacean habitat will be staked and flagged before construction begins and all stakes and flagging will be removed within 60 days after construction completion. Likewise, all suitable vernal pool crustacean habitats located adjacent to construction areas will be protected by placing orange fencing barrier material or stakes and flagging around the wetland perimeter or vernal pool area. The locations of these barriers would be supervised by the biological monitor and clearly marked on all construction plans.

Rather than engage in wet- and dry-season surveying of all wetland features, Beale AFB has decided to assume that the federally-listed vernal pool invertebrate species occur in the vernal pools and swales and depressional seasonal wetlands given the amount of species present in the wetland features on the base. Beale AFB proposes to compensate for direct and indirect effects to suitable vernal pool branchiopod habitat from the proposed projects by utilizing the AFB's preservation and restoration areas. For every acre of habitat directly affected by the proposed actions, two acres of branchiopod habitat would be preserved and one acre would be restored on the base or at another ecosystem preservation bank approved by the Service. For every acre of suitable branchiopod habitat indirectly affected, Beale AFB proposes to compensate with two acres of similar branchiopod habitat preserved on Beale AFB or at another ecosystem preservation bank approved by the Service. The proposed projects would directly affect a total of 7.01 acres and indirectly affect 0.92 acres of suitable vernal pool and depressional seasonal wetlands of branchiopod habitat. Beale AFB proposes to preserve 2.75 acres and restore 0.46 acre of suitable branchiopod habitat.

### **History of Former Consultations at Beale AFB**

The Service has completed thirteen formal section 7 consultations with Beale AFB (Service file numbers 1-1-95-F-019, 1-1-97-F-025, 1-1-97-F-029, 1-1-97-F-035, 1-1-97-F-092, 1-1-98-F-0164, 1-1-98-F-094 (which amended 1-1-98-F-0164), 1-1-99-F-0159, 1-1-00-F-0226 (which was amended by 1-1-01-F-0104), 1-1-01-F-0192, 1-1-03-F-0218, 1-1-04-F-0249, and 1-1-04-F-0294). These formal consultation addressed effects to federally listed vernal pool invertebrates and, to a lesser extent, the threatened valley elderberry longhorn beetle (*Desmocerus californica*

*dimorphus*). As a result of these formal consultations involving federally listed vernal pool crustaceans, Beale AFB has agreed to provide both preservation and restoration of vernal pools within the conservation areas designated in the Conceptual Vernal Pool Management Plan (CVPMP). The current historical Beale AFB obligation of vernal pool preservation and restoration acreage is outlined in Table 1.

Historically, the Service has issued thirteen biological opinions for mostly losses of vernal pool complexes and depressional seasonal wetlands that provide suitable habitat for federally-listed vernal pool crustaceans at Beale AFB. Beale AFB has committed to preservation of approximately 81.84 wetted vernal pool acres and restoration of 31.629 wetted vernal pool acres for proposed projects that have been subject to these biological opinions. Beale AFB completed Phase 1 of vernal pool restoration work in the Vernal Pool Restoration Area on the western side of Beale AFB. In 2001, a little over 16.24 wetted acres of vernal pools were restored to ecological signature in vernal pool restoration areas on the western side of Beale AFB.

**Table 1. Vernal Pool Preservation and Restoration Compensation**

Service Consultation Number	Preservation	Restoration	Total
95-F-019	paid TNC	paid Wildlands	none
97-F-025	0.054 acre	0.027 acre	0.081 acre
97-F-029	0.402 acre	0.016 acre	0.418 acre
97-F-035	0.068 acre	0.034 acre	0.102 acre
97-F-092	0.020 acre	0.010 acre	0.030 acre
98-F-0164	5.78 acres	4.34 acres	10.12 acres
99-F-0159	0.42 acre	0.021 acre	0.441 acre
00-F0226*	0.00 acre	2.88 acres	2.88 acres
01-F-0104	0.684 acre	0.342 acres	1.026 acres
01-F-0192	0.186 acre	0.066 acre	0.252 acre
03-F-0218	0.34 acre	0.04 acre	0.38 acre
04-F-0248	3.02 acres	0.52 acre	3.54 acres
04-F-0294	60.98	23.333	84.313
Total Acres:	71.954 acres	10.629 acres	100.394 acres

(\*Well Fields Laterals, unauthorized fill, only)



In a letter to the Corps dated September 14, 1998, the Service commented on the Draft CVPMP for the *Habitat Conservation and Management Plan (HCMP), Beale AFB, Yuba County, California*. As stated in the September 14, 1998, letter and subsequent biological opinions issued by the Service to Beale AFB, the Air Force should preserve in perpetuity any vernal pool compensation acreage committed as a result of the completed consultations, regardless of whether the HCMP is finalized. In order to be in compliance with these previous biological opinions and this biological opinion, Beale AFB will need to commit to providing suitable occupied vernal pool crustacean habitat in perpetuity upon any future base disposal and reuse.

In 1998, Beale AFB developed a Base Comprehensive General Plan (General Plan) that outlined future development areas to support potential mission and workload expansion at Beale AFB. Implementation of the General Plan will result in the construction of facilities and other actions in areas presently classified as wildlife habitat. Some of these natural areas provide suitable habitat to support threatened and endangered vernal pool shrimp species. In March of 1999, Beale AFB developed a draft HCMP to provide compensation for adverse effects on natural resources associated with implementation of the General Plan. The *Draft Final Habitat Conservation and Management Plan* was finalized in April 2002 and serves as a management guide for identifying effects and developing compensation for the vernal pool fairy shrimp and vernal pool tadpole shrimp. The main purpose of the HCMP is to streamline the compliance process with the Act and Clean Water Act (CWA) for future projects, and it also provides a comprehensive multi-habitat and multi-species approach to natural resource conservation at Beale AFB. The HCMP serves as a biological assessment under Section 7 of the Act and provides part of the information needed to initiate consultation with the Service and National Oceanographic and Atmospheric Administration. Upon implementation of the HCMP, any action taking place in specified development areas will have pre-approved conservation measures that would allow Beale AFB to implement the proposed projects identified in the General Plan while incorporating needed species conservation. Although the proposed projects in this biological opinion are not included in the General Plan, the proposed activities have similar intents and purposes to those of the General Plan, have similar effects to listed vernal pool crustaceans, and have the same compensation.

Implementation of the General Plan would result in the potential loss of up to 28.51 acres or more of existing seasonal wetland habitat for the vernal pool fairy shrimp and vernal pool tadpole shrimp. Subsequent wetland delineations may increase somewhat but not significantly the number of seasonal wetland features that may be occupied habitat for federally listed shrimp species. Adverse effects to other federally listed species have not been identified. The HCMP includes both seasonal wetland preservation and restoration components to compensate for adverse effects to federally-listed vernal pool invertebrates.

The Beale AFB *Integrated Natural Resources Management Plan, March 2005 to March 2009*, (INRMP) addresses natural resource management goals and objectives at the ecosystem level and was prepared in concert with the Base Comprehensive Plan, the Base General Plan, the HCMP,

and the Cultural Resources Management Plan. Beale AFB prepared the INRMP to provide broad and specific management recommendations with goals to achieve some aspects of preserving, improving, enhancing, and monitoring ecosystem integrity, species habitats, and wetlands while meeting the mission requirements of Beale AFB. Although no specific set of projects are anticipated at this time other than what this biological opinion addresses, Beale AFB requested and received approval for exempting incidental take up to the amount of restoration extra credits that have resulted from the vernal pool restoration work that took place in 2001. The Service is exempting incidental take under this biological opinion for only those activities described in the project description and not any activities outlined in the General Plan, in concert with the INRMP, and addressed in the HCMP.

The HCMP is intended to conserve and off-set adverse effects to natural resources associated with implementation of some activities in any of the 14 General Plan Developments Areas through preservation, restoration, and creation of sensitive species habitats. The HCMP identifies one riparian area, two vernal pool creation areas, one vernal pool restoration area, and three vernal pool preservation areas totaling over 2,200 acres on mostly the west side of Beale AFB. The HCMP provides pre-conservation for any activities involving vernal pool resources in any of the development areas and limits the amounts of developments that can occur in three (the Golf Course, Munitions, and Flightline) of the 14 development areas. The HCMP and the seven habitat conservation areas provide sufficient size and quality of vernal pool complexes to off-set the removal of any threatened and endangered vernal pool invertebrates' habitat within any of the 14 general plan areas. In June 2005, Beale AFB and the U. S. Army Corps of Engineers signed a thirteen point Memorandum of Agreement addressing the longterm conservation of vernal pool resources in the vernal pool conservation areas that are identified in the HCMP. Specifically regarding vernal pools, Beale AFB contains a total of 332.4 wetted acres of vernal pools.

### **Status of the Species**

On September 19, 1994, the vernal pool fairy shrimp was federally listed as threatened and the vernal pool tadpole shrimp was federally listed as endangered (59 **FR** 48136), primarily due to ongoing declines of habitat for these species. Critical habitat has been designated for these species (Service 2003); however, no critical habitat has been designated in the action area.

Vernal pool fairy shrimp inhabit seasonally ponded depressions in the Central Valley of California and a disjunctive occurrence on the Agate Desert in Oregon. The adults can be found in vernal pools from early December to early May. Females carry their eggs in a brood sac, and the eggs are either dropped to the pool bottom or remain in the brood sac until the female dies and sinks. The resting or "summer" eggs are known as "cysts." The cysts are capable of withstanding heat, cold and prolonged desiccation. When the pools refill in the same or subsequent seasons, some, but not all, of the cysts may hatch. The cyst bank in the soil may contain cysts from several years of breeding. The cysts hatch when the pools fill with rainwater, and the fairy shrimp develop rapidly into adults which often disappear early in the season, long before the vernal pools dry up. The vernal pool fairy shrimp ranges from Stillwater Plain in Shasta County through most of the length

of the Central Valley to Paisley in Tulare County, and along the central coast range from northern Solano County to Pinnacles National Monument in San Benito County. Other occurrences are in Monterey County, one in Ventura County, one on the Santa Rosa Plateau in Riverside County, one near Rancho California in Riverside County, and one on the Agate Desert near Medford, Oregon.

Vernal pool tadpole shrimp also inhabit seasonally ponded pools in the Central Valley. Like vernal pool fairy shrimp, the tadpole shrimp occurrences lie dormant as cysts in pool sediments during the dry season and the eggs hatch after winter rainwater fills the pools. Sexually mature tadpole shrimp adults have been observed in vernal pools three to four weeks after the pools filled. Some cysts hatch immediately and the rest remain in the soil to hatch during later rainy seasons.

The vernal pool tadpole shrimp ranges from east of Redding in Shasta County south to the San Luis National Wildlife Refuge in Merced County, and from a single vernal pool complex on the San Francisco Bay National Wildlife Refuge in the City of Fremont, Alameda County (California Natural Diversity Database 2004).

Both the vernal pool tadpole shrimp and the vernal pool fairy shrimp occur on Beale AFB lands. In a 1996 vernal pool study on five geomorphic surfaces that occur on Beale AFB, the vernal pool tadpole shrimp adults were found in 21 vernal pools on Riverbank and two Modesto geologic surfaces. Active vernal pool fairy shrimp were found in vernal pools on Laguna, Modesto, and Riverbank geomorphic surfaces. Vernal pool depth had a positive effect and vernal pool surface area had a negative effect on the frequency of active vernal pool fairy shrimp (California Native Plant Society 1996).

### **Environmental Baseline**

Regulations implementing the Act (50 CFR § 402.02) define the environmental baseline as the past and present impacts of all Federal, State, or private actions and other human activities in the action area. Also included in the environmental baseline are the anticipated effects of all proposed Federal projects in the action area that have undergone section 7 consultation and the effects of State and private actions that are contemporaneous with the consultation in progress.

The vernal pool fairy shrimp and vernal pool tadpole shrimp are imperiled by habitat loss caused by a variety of human-caused activities, primarily urban development, water supply/flood control projects, and conversion of land to agricultural use. Only small proportions of the habitats of these crustaceans are protected from these threats. State and local laws and regulations have not been adequate to protect the listed vernal pool crustaceans. Other regulatory mechanisms necessary for the conservation of the habitat of the vernal pool fairy shrimp and the vernal pool tadpole shrimp have proven ineffective.

Holland (1978) estimated that between 60 and 85 percent of the habitat that once supported vernal pools, the endemic habitat of the vernal pool fairy shrimp and vernal pool tadpole shrimp, had been destroyed by 1973. In the ensuing 25 years, a substantial amount of the remaining habitat has been converted for human uses. The rate of loss of vernal pool habitat in the state has been estimated at 2 to 3 percent per year (Holland and Jain 1988). Rapid urbanization of the Central Valley of California currently poses the most severe threat to the continued existence of the vernal pool fairy shrimp. The vernal pools under the jurisdiction of the Sacramento District of the U.S. Army Corps of Engineers include most of the known populations of the vernal pool fairy shrimp and the vernal pool tadpole shrimp (Coe 1988). Coe (1988) estimated that within 20 years, 60 to 70 percent of the habitat will be destroyed by human activities.

The habitat of the listed vernal pool crustaceans is highly fragmented throughout their ranges due to conversion of natural habitat for urban and agricultural uses. This fragmentation results in small isolated vernal pool fairy shrimp and vernal pool tadpole shrimp populations. Ecological theory predicts that such populations will be highly susceptible to extinction due to chance events, inbreeding depression, or additional environmental disturbance (Gilpin and Soule 1986; Goodman 1987a, b). Should an extinction event occur in a population that has been fragmented, the opportunities for recolonization are thought to be greatly reduced due to geographical isolation from other source populations.

The ephemeral wetlands that support this network of occurrences are remnants a formerly pristine vernal pool ecosystem, but which has been converted to primarily agricultural and urban uses. This highly disturbed remnant habitat is not protected and the existing populations of the vernal pool fairy shrimp are imperiled by numerous human activities. These activities include excavations and maintenance procedures that alter local hydrological conditions, conversion of grasslands to vineyards, and activities that result in the introduction of toxic substances (e.g., pesticides and spills, illegal dumping of hazardous materials).

Yuba County contains occurrences of both the vernal pool tadpole shrimp and vernal pool fairy shrimp. Vernal pools on Beale AFB are Northern Hardpan Vernal Pools and occur predominantly in the western central and southern portions of the base (Sawyer and Keeler-Wolf 1995). Beale AFB has identified and established three vernal pool preservation areas, one vernal pool restoration area, and two vernal pool construction areas to compensate for the losses of and adverse effects to the vernal pool tadpole shrimp and vernal pool fairy shrimp. On Beale AFB, dry season vernal pool sampling for federally-listed branchiopod cysts was conducted in 1,000 randomly selected vernal pools in 1995 and revealed that cysts of both vernal pool crustaceans were present. Wet season sampling was conducted in the same 1,000 vernal pools in 1996; vernal pool fairy shrimp were found in 134 pools and vernal pool tadpole shrimp were discovered in 29 pools (Jones and Stokes 1998b). Given the presence of the vernal pool crustacean species on Beale AFB, the Air Force has decided to assume the presence of the vernal

pool tadpole shrimp and the vernal pool fairy shrimp in the vernal pools and depressional seasonal wetlands at Site 38, the DCSH parking lot, and those wetlands near the main gate that will be used for vernal pool soil donor inoculum for the planned Phase 2 of vernal pool restoration.

### **Effects of the Action**

The three proposed projects would result in direct adverse effects up to 7.01 acres of wetted vernal pool habitat and indirect effects to 0.92 acres of wetted vernal pool habitat for the two federally-listed vernal pool crustaceans. These direct and indirect adverse effects resulting from these three proposed projects would result of fill of or excavation of suitable vernal pool branchiopod habitat, vehicle and construction equipment use, and access and activities needed for the proposed projects. Collection of soil donor inoculum may destroy up to 6.53 acres ( $1.98 + 4.55 = 6.53$ ) of vernal pool soils that contain cysts of vernal pool crustaceans. However, not all the cysts in these collected soils would be destroyed by the collection, transport, and spreading of the vernal pool soil inoculum. Because construction activities would be limited to the dry season, it is anticipated that adverse effects to the species would be limited to the direct and indirect losses of suitable vernal pool crustacean habitats, including vernal pools and depressional seasonal wetlands. The proposed activities would result in vernal pool branchiopod cysts being destroyed, damaged or harmed as a result of being buried and from vehicles and equipment driving on and crushing the cysts located in the vernal pool soils of the vernal pool grasslands that occur within the perimeter of the construction zones. Beale AFB proposes to compensate proposed project-related effects by preserving existing suitable vernal pool branchiopod habitat and restoring additional suitable vernal pool branchiopod habitat on the base. Table 2 details the amounts of adverse effects and associated compensation for each part of the proposed actions and depicts what amount of vernal pool restoration credit will be available for future base projects.

**Table 2**  
**Summary of Proposed Project Components, Effects, and Associated Compensation**  
**(in acres)**

Project	Affected Area		Preservation		Restoration		Total Compensation
	Direct	Indirect	Direct	Indirect	Direct	Indirect	
Site 38	0.42	0.92	0.84	1.84	0.42	0.00	3.10
DECSG Parking Lot	0.04	0.00	0.09	0.00	0.04	0.00	0.13
Vernal Pool Restoration <sup>2</sup>	Up to 6.53	0.00	0.00	0.00		0.00	
Total acres	7.01	0.92	0.93	1.84	0.46	0.00	3.23

2 Note that the amount of vernal pool inoculum is the addition of the 1.98 wetted vernal pool acres near the Main Gate and up to 4.55 acres of collected soil inoculum from the 4 smeared vernal pools that are in the vernal pool restoration area. Vernal pool inoculum contains vernal pool cysts not all of which will be destroyed and that, with 100 percent success, all the restored vernal pools will become colonized by federally listed vernal pool crustaceans either by direct inoculum or via cattle grazing bringing cysts to the newly restored vernal pools from proximate occupied vernal pools. The 10.84 acres will be available as credit for future base projects.

As stated in the November 1998 *Final Conceptual Vernal Pool Restoration and Monitoring Plan*, Beale AFB proposes to compensate all vernal pool effects within the Beale General Plan development area through preservation at a minimum target ratio of 2.0:1 and restoration/creation at a 1.0:1 ratio. Conservation of vernal pool crustacean habitat at these ratios would offset effects to vernal pool fairy shrimp and vernal pool tadpole shrimp resulting from activities associated with the proposed projects. Additionally, implementation of the General Plan and Phase 2 of the CVPRM plan that would provide restored vernal pool habitat that is preserved and managed in perpetuity in those compensation areas would meet the conservation needs of the species.

Beneficial effects from the proposed vernal pool restoration Phase 2 include providing additional suitable habitat for both the vernal pool tadpole shrimp and vernal pool fairy shrimp that would not otherwise become available in the natural course of time and events. The beneficial effects would be derived from deepening the four donor smeared vernal pool areas that are proximate to the one being restored. This deepening of the four smeared vernal pools most likely improves suitability and the quality of habitat for the two federally listed vernal pool crustaceans. Likewise, the naturally slow colonization process by which the vernal pool fairy shrimp and the vernal pool tadpole shrimp may successfully establish in the 10.84 acres newly restored vernal pools will most likely be accelerated by the vernal pool donor soil being spread into the bottoms of the newly restored vernal pools.

**Cumulative Effects**

Cumulative effects include the effects of future State, Tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of the Act. The Service anticipates that a range of activities at Beale AFB will affect the vernal pool tadpole shrimp and the vernal pool fairy shrimp. Such activities may include, but are not limited to, flood control, roadway and utility projects, use of chemical products that may result in non-target contamination, as well as expansion of on-base facilities for military or military-related activities. We anticipate that most, if not all, of these activities at Beale AFB will be funded or carried out by the Air Force.

**Conclusion**

After reviewing the current status of the listed vernal pool crustaceans, the environmental baseline for the action area, the effects of the proposed actions and the cumulative effects, it is the Service's biological opinion that the proposed actions are not likely to jeopardize the continued existence of the vernal pool fairy shrimp or vernal pool tadpole shrimp. The Service reached this conclusion because the project-related effects to these species would be not rise to the level of precluding recovery of either species or reducing the likelihood of survival of the species. Additionally, the proposed conservation measures would offset the adverse effects from the proposed actions through habitat compensation as proposed and already implemented in the CVPRM and HCMP. Currently, no critical habitat has been designated for vernal pool fairy shrimp and vernal pool tadpole shrimp in the action area; therefore, none will be affected.

**INCIDENTAL TAKE STATEMENT**

Section 9 of the Act, and Federal regulations issued pursuant to section 4(d) of the Act, prohibit take of endangered and threatened species without a special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that actually kills or injures a listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as an action that creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), such incidental taking is not considered to be a prohibited taking under the Act provided that such taking is in compliance with this Incidental Take Statement.



The measures described below are non-discretionary and must be implemented by the Air Force, as appropriate, in order for the exemption in section 7(o)(2) to apply. Beale AFB has a continuing duty to regulate the activity that is covered by this incidental take statement. If the Air Force fails to comply with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

### **Amount or Extent of Take**

The Service anticipates incidental take of the listed vernal pool crustaceans will be difficult to detect for the following reasons: (1) these species have small body size, therefore finding a dead or injured specimen is unlikely; (2) these species occur in habitats that makes detection difficult; and (3) losses may be masked by seasonal and annual fluctuations in numbers, chance events, changes in water regime, or additional environmental disturbance. Due to the difficulties in quantifying the number of individuals that will be taken as a result of the proposed action, the Service is quantifying take incidental to this project as the number of acres of suitable habitat for the listed crustacean species that will become less suitable for this species as a result of the action. The Service estimates that all vernal pool fairy shrimp and all vernal tadpole shrimp inhabiting up to 7.01 wetted acres of vernal pool habitat would be directly lost and 0.92 acre of vernal pool habitat will be indirectly affected as a result of the proposed projects.

Upon implementation of the following reasonable and prudent measures, the Site 38 and the DCGS Parking Lot proposed projects' direct and indirect losses of 1.38 wetted acres of suitable vernal pool branchiopod habitat will become exempt from the prohibitions described under section 9 of the Act. Likewise, up to an additional 6.53 (1.98 plus 4.55=6.53) wetted acres of suitable branchiopod habitat may be disturbed and take occur as a result of the harvesting and spreading of vernal pool soil inoculum during Phase 2 of the vernal pool restoration work. However, we do not anticipate that all the cyst will be destroyed during collection, transport, and spreading of vernal pool soil inoculum. The listed vernal pool crustaceans as cysts may be harmed, harassed, killed, or injured in association with the project-related activities that are exempted under Section 9 of the Act. No take that is not associated with the proposed projects described in this document is authorized under this biological opinion.

### **Effect of the Take**

In the accompanying biological opinion, the Service determined that this level of anticipated take of up to 7.91 (1.38 plus 6.53 equals 7.91) wetted acres of suitable vernal pool crustacean habitat is not likely to result in jeopardy to the vernal pool fairy shrimp, vernal pool tadpole shrimp, or destruction or adverse modification of critical habitat.

### **Reasonable and Prudent Measures**

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize the impact of taking vernal pool crustaceans:

1. Minimize direct and indirect effects to the vernal pool tadpole shrimp and vernal pool fairy shrimp during project construction.
2. The effects of habitat loss to the two federally-listed vernal pool crustaceans shall be minimized through preservation of natural vernal pools and restoration of vernal pools that will contribute to the conservation of the species.

### **Terms and Conditions**

In order to be exempt from the prohibitions of Section 9 of the Act, Beale AFB must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary:

1. The following terms and conditions implement reasonable and prudent measure number one (1):
  - A. The Air Force shall minimize the potential for take of the vernal pool fairy shrimp and the vernal pool tadpole shrimp from project-related activities by implementation of the conservation measures as described in the biological assessment and the project description of this biological opinion. However, the terms and conditions of this biological opinion will take precedence over the Air Forces Plans in instances where the actions in the terms and conditions exceed those in the Plans as noted in the Project Description.
  - B. If the Air Force utilizes an outside contractor to implement the proposed projects, the Air Force shall include a copy of this biological opinion within its solicitations and contracts for construction on the projects making the prime contractor responsible for implementing all requirements and obligations included in this biological opinion, and to educate and inform all other contractors involved in the proposed projects as to the requirements of the biological opinion.
  - C. High visibility fencing that is at least 1.5 meters (5 feet) in height shall be placed and maintained around any avoided vernal pool habitat to prevent vehicle entry during project construction. No construction material or soil shall be placed within 50 feet of the any avoided vernal pools.
  - D. All garbage and construction-related materials in construction areas shall be removed immediately following project completion.

- E. The Air Force shall implement Best Management Practices (BMPs) to prevent sediment from entering the avoided vernal pools that will not be permanently destroyed at the project sites, including, but are not limited to, silt fencing, hay bales, no cleaning equipment in or near the vernal pools and other wetlands, and temporary sediment disposal.
- F. A qualified biologist shall be on-site or on-call during all activities that could result in the take of the vernal pool fairy shrimp and the vernal pool tadpole shrimp. The qualifications of the biologist must be presented to the Service for review and approval prior to any ground-breaking at the project sites. The biologist must be given the authority to stop any work that may result in take of the vernal pool tadpole shrimp or the vernal pool fairy shrimp. If the biologist exercises this authority, the Service and the California Department of Fish and Game (CDFG) must be notified by telephone and letter within one (1) working day.
- G. A worker training program about the vernal pool fairy shrimp and vernal pool tadpole shrimp for construction personnel shall be conducted before groundbreaking at the proposed projects. The program shall provide workers with information on their responsibilities with regard to listed vernal pool species, an overview of the life-history of the species, and a description of the measures being taken to reduce effects to these species during project construction. The Air Force shall submit proof of the training to the Chief of the Endangered Species Division (Central Valley), Sacramento Fish and Wildlife Office (SFWO), 2800 Cottage Way, Room W-2605, Sacramento, California, 95825-1846.
- H. The Air Force shall ensure that, if pesticides and herbicides at the proposed project sites are used, label and other restrictions mandated by the U.S. Environmental Protection Agency and California Department of Food and Agriculture are observed as well as any additional project-related recommendations by the Service or the California Department of Fish and Game.
- I. Upon completion of the project, all vernal pool fairy shrimp and vernal pool tadpole shrimp habitat subject to temporary ground disturbances, including storage and staging areas, etc. shall be re-contoured to original contours, and be allowed to revegetate to promote restoration of the area to its original conditions. An area subject to "temporary" disturbance means any area that is disturbed during the project, but that, after project completion, will not be subject to further disturbance and has the potential to revegetate.

- J. If requested, during or upon completion of construction activities, the on-site biologist, or a representative from the Air Force shall accompany Service and/or California Department of Fish and Game personnel on an on-site inspection of the site to review project effects to the vernal pool fairy shrimp and the vernal pool tadpole shrimp, and their habitats.
2. The following terms and conditions implement reasonable and prudent measure number two (2):
    - A. As described on pages 8-1 through 8-8 of the biological assessment and in the project description of this biological opinion, the direct effects to vernal pool crustacean habitat resulting from the proposed project shall be minimized through vernal pool preservation at a 2.0:1 ratio. No less than 2.75 wetted acres of vernal pools shall be preserved within the CVPRM areas as a result of the proposed DCGS Parking Lot and Site 38 proposed project work. The preserved vernal pools and their surrounding watershed shall be protected as vernal pool habitat, managed for the benefit of listed vernal pool crustaceans, and preserved in perpetuity from future development.
    - B. As described on pages 8-1 through 8-8 of the biological assessment and in the project description of this biological opinion, the indirect effects to vernal pool crustacean habitat resulting from the proposed project shall be minimized through vernal pool restoration at a 1.0:1 ratio. No less than 0.46 wetted acre of suitable vernal pool crustacean habitat shall be restored as a result of the proposed DCGS Parking Lot and Site 38 proposed project work within areas identified by the CVPRM plan. The 0.46 acres of restored vernal pools and their surrounding watershed shall be protected as vernal pool crustacean habitat, managed for the benefit of federally-listed listed vernal pool crustaceans, and preserved in perpetuity from future development.
    - C. Beale AFB shall report to the Service the completion of vernal pool restoration work in association with the proposed project. Phase 2 vernal pool restoration will mostly likely result in 10.38 acres of suitable habitat being successfully restored on the base.
    - D. If the Air Force would ever vacate or transfer title to any part of the lands set aside as vernal pool preservation or restoration/creation, the Air Force shall assure provisions are in place, prior to vacating or transferring title, for the protection of the vernal pool tadpole shrimp and vernal pool fairy shrimp and their habitat in perpetuity.

### CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities that can be implemented to further the purposes of the Act, such as preservation of endangered species habitat, implementation of recovery actions, or development of informational databases.

1. The Air Force should implement conservation measures, assist or fund any research, or allow access for research on Beale AFB that promotes the recovery of listed vernal pool crustaceans or their habitats.
2. The Air Force should provide educational opportunities addressing the value and importance of maintaining healthy ecosystems, including vernal pool habitat to local school districts, interested groups, or individuals.
3. In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

### REINITIATION NOTICE

This concludes formal consultation on the proposed projects. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if; (1) the amount or extent of incidental take is exceeded, (2) new information reveal effects of the proposed action may affect listed species or critical habitat in a manner or to an extent not considered in this opinion, (3) the agency action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in this opinion, or (4) a new species is listed or critical habitat is designated that may be affected by the proposed action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

If you have any questions regarding this biological opinion, please contact Ken Fuller or Peter Cross, Chief, Endangered Species Division of my staff at (916) 414-6645.

Sincerely,



Kenneth Sanchez  
Acting Field Supervisor

Lt. Col. Gregory P. Long

18

cc:

AES Portland, OR

California Department of Fish and Game, Sacramento Valley and Central Sierra Region, 1701  
Nimbus Road, Rancho Cordova, California 95670 (Attn: Kent Smith)

State Water Resources Control Board, Central Valley Region, 3443 Routier Road, Sacramento,  
California 95827-3098 (Attn: Gary Carlton)

### LITERATURE CITED

- Beale AFB. 2000. Final Soil Suitability Assessment for a Portion of the Vernal Pool Restoration Area. Prepared by Jones and Stokes, Sacramento, California. April, 2000.
- \_\_\_\_\_. 2000. Wetland Delineation for the Vernal Pool Seasonal Wetland Restoration Design at Beale AFB. Prepared by Jones and Stokes, Sacramento, California. June, 2000.
- \_\_\_\_\_. 2001. Delineation of Waters of the United States for Areas Potentially Included in the Habitat Conservation and Management Plan for Beale Air Force Base. Prepared by Jones and Stokes, Sacramento, California. August, 2001.
- \_\_\_\_\_. 2002. Draft Final Habitat Conservation and Management Plan for Beale AFB, California. Prepared by Jones and Stokes, Sacramento, California. April, 2002.
- \_\_\_\_\_. 2005. Windo Biological Assessment, Beale AFB. May 2005. Prepared by Engineering-Environmental Management, Inc. Rancho Cordova, California.
- Coe, T. 1988. The application of Section 404 of the Clean Water Act to Vernal Pools. Pages 356-358 in J. A. Kusler, S. Daly, and G. Brooks (eds.). Urban Wetlands. Proceedings of the National Wetland Symposium. Oakland, California.
- California Native Plant Society. 1996. Patterns of vernal pool diversity at Beale AFB. Pages. 151-160 in Carol Witham (ed). Ecology, Conservation, and Management of Vernal Pool Ecosystems, Proceedings from a 1996 Conference. Sacramento, California.
- California Natural Diversity Database. 2004. An electronic database. Natural Heritage Division. California Department of Fish and Game. Sacramento, California.
- Gilpin, M. E. and M. E. Soulé. 1986. Minimum viable populations: processes of species extinction. Pages 18 - 34 in M. E. Soulé (ed.). Conservation biology: the science of scarcity and diversity. Sinauer Associates, Inc. Sunderland, Massachusetts.
- Goodman, D. 1987a. The demography of chance extinction. Pages. 11-19 in M. E. Soulé (ed.). Conservation biology: the science of scarcity and diversity. Sinauer Associates, Inc. Sunderland, Massachusetts.
- \_\_\_\_\_. 1987b. How do any species persist? Lessons for conservation biology. Conservation Biology 1: 59-62.
- Holland, R. F. 1978. The geographic and edaphic distribution of vernal pools in the Great Central Valley, California. California Native Plant Society, Special Publ. 4:1-12.



- Holland, R. F. and S. Jain. 1988. Vernal Pools. Pages 515-533 *in* M. E. Barbour and J. Major, (eds.). *Terrestrial Vegetation of California*. California Native Plant Society. Sacramento, California.
- Jones and Stokes Associates, Inc. 1998a. Conceptual vernal pool restoration and monitoring plan for the habitat conservation and management plan for Beale Air Force Base. Final. August. (JSA 96-202) Sacramento, California. Prepared for U.S. Army Corps of Engineers, Sacramento District, Sacramento, California.
- Jones and Stokes Associates, Inc. 1998b. Revised Final Report, Beale Air Force Base Ecosystem Study: Phase II – Surveys for Special Status Aquatic Invertebrate, Botanical, and Wildlife Resources. Prepared for the Nature Conservancy, Sacramento, California.
- Sawyer, J. and T. Keeler-Wolf. 1995. *A manual of California Vegetation*. California Native Plant Society Press. Sacramento, California. 471 pp.
- U. S. Army Corps of Engineers. 1999. Integrated Natural Resources Management Plan - Beale Air Force Base, California. Volume I and Volume II. January Sacramento, California. Prepared with technical assistance from Jones and Stokes Associates (JSA 96-219) Sacramento, California Prepared for Beale Air Force Base, California.
- U.S. Fish and Wildlife Service. 1994. Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for the Conservancy Fairy Shrimp, Longhorn Fairy Shrimp, and Vernal Pool Tadpole Shrimp; and Threatened Status for the Vernal Pool Fairy Shrimp. Federal Register 59: 48136-48153.
- U. S. Fish and Wildlife Service. 2003. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for Four Endangered Vernal Pool Crustaceans and Eleven Vernal Pool Plants in California and Oregon. Federal Register 68: 46684-46857.

**Summary of Proposed Action Impacts to Jurisdictional Waters of the U.S.**

<b>Impact Type</b>	<b>Project</b>	<b>Acreage</b>
Direct Impact	Construct Heritage Park	0.1916
Direct Impact	Install Global Hawk LRE Cables	0.0163
Direct Impact	Vernal Pool Restoration Phase 2	12.0004
Direct Impact	Construct Visitor Center Main Gate	0.0462
Direct Impact	Erosion Control at Upper Blackwelder Lake	0.1215
Direct Impact	Erosion Control at Miller Lake	0.6864
Direct Impact	Erosion Control at Lower Blackwelder Lake	0.6298
<b>Total</b>		<b>13.6920</b>

Impact Type	Project	Wetland ID	Wetland Type	Label	Acreage
Direct Impact	Construct Heritage Park	HP369	DISTURBED SEASONAL WETLAND	PEM1x	0.0026
Direct Impact	Construct Heritage Park	HP504	DISTURBED SEASONAL WETLAND	PEM1x	0.0037
Direct Impact	Construct Heritage Park	HP360	INTERMITTENT RIVERINE	R4SB	0.0016
Direct Impact	Construct Heritage Park	HP368	INTERMITTENT RIVERINE	R4SB	0.1838
Total					<b>0.1916</b>
Direct Impact	Install Global Hawk LRE Cables	GH442A	DISTURBED SEASONAL WETLAND	PEM1x	0.0111
Direct Impact	Install Global Hawk LRE Cables	GH443C	DISTURBED SEASONAL WETLAND	PEM1x	0.0024
Direct Impact	Install Global Hawk LRE Cables	GH443E	DISTURBED SEASONAL WETLAND	PEM1x	0.0013
Direct Impact	Install Global Hawk LRE Cables	GH443B	DISTURBED SEASONAL WETLAND	PEM1x	0.0000
Direct Impact	Install Global Hawk LRE Cables	GH443A	DISTURBED SEASONAL WETLAND	PEM1x	0.0015
Total					<b>0.0163</b>
Direct Impact	Vernal Pools Restoration Ph 2/Site 1	4	VERNAL POOL	PEM1J	0.9095
Direct Impact	Vernal Pools Restoration Ph 2/Site 1	3	VERNAL POOL	PEM1J	1.4915
Direct Impact	Vernal Pools Restoration Ph 2/Site 1	2	VERNAL POOL	PEM1J	1.5802
Direct Impact	Vernal Pools Restoration Ph 2/Site 1	1	VERNAL POOL	PEM1J	0.6062
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0512
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.4616
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.1136
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0478
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.1030
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0755
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.2129
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0481
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0711
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0336
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0389
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0233
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0202
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0403
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0619
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.1283
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0753
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.1405
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.1834
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.1258
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.3599
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.3154
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0518
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.1445
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.1006
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.2169
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0561
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.1121
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.1066
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.1654
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0865

Impact Type	Project	Wetland ID	Wetland Type	Label	Acreage
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0817
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0302
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0189
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0214
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0213
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0579
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0266
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0116
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0293
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0357
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0140
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0155
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0193
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0140
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0189
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0081
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0214
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0213
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0284
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0579
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.1121
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.1056
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.1522
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.1335
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0815
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0263
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0493
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0266
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0991
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0269
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0839
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0388
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0225
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0595
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0505
Direct Impact	Vernal Pools Restoration Ph 2/ Site 2	NA	VERNAL POOL	PEM1J	0.0813
Direct Impact	Vernal Pool Restoration Ph 2/Inoculum	DSW-56	OTHER SEASONAL WETLAND	PEM1	0.0926
Direct Impact	Vernal Pool Restoration Ph 2/Inoculum	DSW-57	OTHER SEASONAL WETLAND	PEM1	0.0085
Direct Impact	Vernal Pool Restoration Ph 2/Inoculum	DSW-58	OTHER SEASONAL WETLAND	PEM1	0.0278
Direct Impact	Vernal Pool Restoration Ph 2/Inoculum	VP-56	VERNAL POOL	PEM1J	0.0813
Direct Impact	Vernal Pool Restoration Ph 2/Inoculum	VP-54	VERNAL POOL	PEM1J	0.0612
Direct Impact	Vernal Pool Restoration Ph 2/Inoculum	VP-52	VERNAL POOL	PEM1J	0.0493
Direct Impact	Vernal Pool Restoration Ph 2/Inoculum	VP-58	VERNAL POOL	PEM1J	0.0565
Direct Impact	Vernal Pool Restoration Ph 2/Inoculum	VP-53	VERNAL POOL	PEM1J	0.3306
Direct Impact	Vernal Pool Restoration Ph 2/Inoculum	VP-178	VERNAL POOL	PEM1J	1.1891
Direct Impact	Vernal Pool Restoration Ph 2/Inoculum	VP-57	VERNAL POOL	PEM1J	0.0409
				Total	12.0004

Impact Type	Project	Wetland ID	Wetland Type	Label	Acreage
Direct Impact	Construct Visitor Center Main Gate	RSW1	RIVERINE SEASONAL WETLAND	R2EM	0.0462
Total					<b>0.0462</b>
Direct Impact	Erosion Control at Upper Blackwelder Lake	UBL2	Intermittent Riverine	R4SB	0.0344
Direct Impact	Erosion Control at Upper Blackwelder Lake	UBL3	Intermittent Riverine	R4SB	0.0058
Direct Impact	Erosion Control at Upper Blackwelder Lake	UBL1	Lacustrine	L2EM4	0.0045
Direct Impact	Erosion Control at Upper Blackwelder Lake	UBL1	Lacustrine	L2EM4	0.0768
Total					<b>0.1215</b>
Direct Impact	Erosion Control at Miller Lake	ML1	LACUSTRINE	L2EM4	0.6095
Direct Impact	Erosion Control at Miller Lake	ML2	RIVERINE EMERGENT WETLAND	R2EM	0.0768
Total					<b>0.6864</b>
Direct Impact	Erosion Control at Lower Blackwelder Lake	1	LACUSTRINE	L2EM4	0.6298
Total					<b>0.6298</b>